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Flocculation Experiments with Variola and Vaccinia Virus*

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IMMUNOLOGICAL studies of viruses have shown clearly and uniformly that virucidal properties are developed in the serum of animals following an attack of the disease and in some instances following injection of the killed virus. The demonstration of agglutinins, precipitins or complement-fixing antibodies has not been so convincing and, in contrast to bacterial antigens, doubt exists whether the viruses, as a class, are capable of stimulating such antibodies. Fairly clear-cut evidence, both for and against their existence, has been recorded.

Gordon[1] has described specific complement-fixation and flocculation with vaccinia and variola, and Burgess, Craigie and Tulloch[2] have utilized the flocculation test as a practical diagnostic procedure for the differentiation of smallpox and chicken pox. Takaki and Koref[3] used complement-fixation to identify the viruses of herpes, rabies and encephalitis. Ciuca[4] reports successful complement-fixation experiments with the virus of foot and mouth disease and Bedson and Bland,[5] in addition to a number of other investigators, have confirmed Gordon's results with vaccinia. Recently, Frobisher[6] has reported complement-fixation reactions with the virus of yellow fever and the serums of men and monkeys.

In contrast to these findings, indicating that viruses are similar to bacterial antigens in the production of antibodies, Schultz, Bullock and Lawrence,[7] among others, were unable to demonstrate any other than specific neutralizing antibodies in the serum of rabbits immunized against vaccinia. Ward[8] reports negative complement-fixation experi-

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ments with vaccinia filtrates, which were potent as shown by rabbit inoculation.

It is our purpose to describe the production of anti-vaccinia flocculating serum in the rabbit and in the human subject, the successful demonstration of specific flocculation of vaccinia virus by its antiserum, as well as observations of the usefulness of the reaction as a practical diagnostic test.

Preparation of Flocculating Serums—Nine serums have been prepared by intraperitoneal, intravenous, subcutaneous and intradermal inoculations. Antigens for immunization were 2d and 3d passage rabbit dermal virus and rabbit brain virus. The dermal virus was preserved, after harvesting, by drying in a desiccator at 4° C. Brain virus was preserved in 50 per cent glycerin at 4° C. The strain of neurovaccine was obtained through the kindness of Dr. Peter Olitzky of the Rockefeller Institute. Fresh suspensions in normal saline were prepared by grinding in a mortar for each injection, centrifugated and the supernatant fluids diluted to the desired concentration for the injections according to $BaSO_4$ turbidity standards. The general scheme of immunization for the subcutaneous and intravenous inoculations is illustrated in Table I.

Serums Nos. 1, 2, 3 and 4 were obtained from rabbits vaccinated intradermally with 2d passage rabbit dermal virus. The backs were

TABLE I

PRODUCTION OF ANTI-VACCINIA FLOCCULATING SERUMS

Rabbit No. 5 Intravenous Dermal Virus Potency 1 : 8,000			Rabbit No. 6 Subcutaneous Dermal Virus Potency 1 : 8,000			Rabbit No. 8 Intravenous Brain Virus Potency 1 : 200,000			Rabbit No. 9 Subcutaneous Brain Virus Potency 1 : 200,000			Rabbit No. 11 Intravenous Brain Virus Potency 1 : 150,000		
Date	Amt. Virus (gms.)	Vol. (c.c.)	Date	Amt. Virus (gms.)	Vol. (c.c.)	Date	Amt. Virus (gms.)	Vol. (c.c.)	Date	Amt. Virus (gms.)	Vol. (c.c.)	Date	Amt. Virus (gms.)	Vol. (c.c.)
1–22	0.001	0.1	1–22	0.005	0.5	2–18	0.005	0.1	2–17	0.025	0.5	5–22	0.003	0.1
1–23	0.002	0.2	1–23	0.005	0.5	2–19	0.005	0.1	2–18	0.025	0.5	5–23	0.006	0.2
1–24	0.002	0.2	1–24	0.005	0.5	2–22	0.005	0.1	2–19	0.05	1 0	5–24	0.010	0.2
1–28	0.003	0.3	1–28	0.01	1.0	2–23	0.01	0.2	2–22	0.05	0.5	5–27	0.010	0.1
1–29	0.005	0.5	1–29	0.01	1.0	2–24	0.01	0.2	2–23	0.1	1.0	5–28	0.020	0.2
1–30	0.005	0.5	1–30	0.02	2.0	2–27	0.01	0.2	2–24	0.1	1.0	5–29	0.025	0.5
2–3	0.01	1.0	2–3	0.02	2.0	2–28	0.025	0.5	2–27	0.2	1.0	6–2	0.025	0.5
2–4	0.02	2.0	2–4	0.03	3.0	3–1	0.025	0.5	2–28	0.2	1.0	6–4	0.05	1.0
2–5	0.02	2.0	2–5	0.05	5.0	3–8	Bled.	Titer 1 : 64	3–1	0.4	2.0	6–5	0.025	0.5
2–12	Bled.	Titer 1 : 32	2–12	Bled.	Titer 1 : 32				3–8	Bled.	Titer 1 : 32	6–11	0.025	0.5
												6–12	0.03	0.6
												6–13	0.03	0.6
												6–20	Bled.	Titer 1 : 64

denuded of hair from the shoulders to the flanks, the skin scarified and inoculated with vaccinia virus harvested from another rabbit similarly vaccinated. These serums, obtained 12–14 days following inoculation, yielded on the whole as satisfactory titers as those obtained by intravenous and subcutaneous inoculations. Two rabbits, inoculated intraperitoneally, according to the general scheme of the intravenous and subcutaneous injections, failed to yield a flocculating serum. The rabbits were bled from the heart, the serums removed from the clots and stored under aseptic conditions without addition of preservative and without inactivation.

We have not succeeded in obtaining in the rabbit a higher titer than 1:64, either with dermal or brain virus. Efforts to increase the potency of the serum by injecting large amounts of virus failed, particularly in the case of the brain virus, due to the fact that intravenous injections of brain tissue in amounts larger than 0.5 c.c. of a 1:20 suspension usually caused immediately fatal convulsions. Subcutaneous injections of brain virus up to 0.4 gm. failed, in the case of 2 rabbits, to produce a higher titer than 1:32. The titrations of the serums are given in Table II.

TABLE II

TITRATION OF ANTI-VACCINIA FLOCCULATING SERUMS

Serum	Method of Inoculation	Virus Used	Titer Before Immunization	Dermal Virus (1 : 100)					Brain Virus (1 : 100)				
				1 : 8	1 : 16	1 : 32	1 : 64	1 : 128	1 : 8	1 : 16	1 : 32	1 : 64	1 : 128
1	Intradermal	Dermal	−	++	++	++	+	−	0	0	0	0	0
2	"	"	−	++	++	+	−	−	++	++	+	−	−
3	"	"	−	++	++	++	++	±	0	0	0	0	0
4	"	"	−	++	++	++	+	−	+	+	+	−	−
5	Intravenous	"	−	++	++	+	±	−	++	++	+	−	−
6	Subcutaneous	"	−	++	++	++	−	−	++	+	+	−	−
7	Intraperitoneal	"	−	+	±	−	−	−	±	−	−	−	−
8	Intravenous	Brain	−	++	++	+	±	−	++	++	++	++	−
9	Subcutaneous	"	−	0	0	0	0	0	++	++	+	−	−
11	Intravenous	"	−	++	++	++	−	−	++	++	++	+	−

++ = Heavy precipitation visible at bottom of tube
+ = Light but definite precipitate
± = Very slight precipitation
− = No precipitation in dilution of serum 1: 8
0 = Not tested

Preparation of the Antigens for the Tests—The antigens used in the tests, whether of dermal or brain origin, were first ground in a mortar with the addition of small amounts of 0.85 per cent sodium chloride solution. After thorough grinding and further dilution with

salt solution to make an approximate 1:100 suspension, the material was centrifugated for 2 minutes at 2,000 r.p.m. The supernatant suspension was then diluted until the turbidity was equal to that of $BaSO_4$ standard No. 1. This was found to be approximately the turbidity of the supernatant of a 1:100 suspension of rabbit brain after centrifugation. Where more dilute antigenic suspensions were used, they were prepared by dilution of the 1:100 suspensions with salt solution. Usually 1:100 suspensions, which, after centrifugation, were only slightly turbid, gave satisfactory results, but in some experiments more dilute antigens, even 1:1,000, flocculated well (see Table IX). As a rule, heavier suspensions, such as 1:20 or 1:50, did not give as heavy a precipitate as did 1:100 or even more dilute. This is illustrated with a brain virus in Table IV.

Titration of Potency of Antigens—The potency of all antigens, both dermal and brain, was determined by intradermal injection into the denuded backs of rabbits of 0.05 c.c. amounts of serial dilutions of the virus. The titer of a given virus was taken as the highest dilution which caused a definite lesion.

Technic of the Tests—Serological tubes (10 x 100 mm.) were used. Serial dilutions of the flocculating serum were placed in the tubes in 0.3 c.c. amounts and to each was added 0.3 c.c. of the antigenic suspension. Controls with salt solution and normal rabbit serum were included for each antigen. The tests were incubated in a water bath at 37° C., readings usually being made at 1, 2, 4, 6 and 18 hours. When the titer of a serum was being determined the 24-hour reading was taken as final.

A few ring tests were also made, both with undiluted serum and serial dilutions of antigen, and *vice versa*. While a definite ring usually formed with appropriate dilutions of antigen or serum, the results, on the whole, were not so clear-cut as with flocculation. Incubation of the tests at 56° C., as recommended by Gordon[1] and Burgess, Craigie and Tulloch,[2] gave indifferent results. The amount of flocculation was never great and rarely occurred except in low dilutions of serum.

Specificity of the Reaction—The unequivocal and consistent flocculation obtained with brain vaccinia and immune serum prepared by injection of brain virus can hardly be interpreted in any other way than as the result of a specific reaction between vaccinia virus and the immune serum. In view of negative results reported by Schultz and his coworkers[7] with brain virus free of bacteria and his contention that the precipitation obtained with dermal virus was due to contaminating bacteria, this point has been investigated and the absorption experiments described by Burgess, Craigie and Tulloch repeated.

TABLE III

ABSORPTION EXPERIMENTS WITH BACTERIA DERIVED FROM RABBIT SKIN

Serum	No. 1				No. 2				No. 3				No. 4	
	Unabsorbed Serum				Absorbed with Dermal Virus				Absorbed with S1, S2, and S3				Absorbed with S3	
	Tested with				Tested with				Tested with				Tested with	
	Dermal Virus	S1	S2	S3	Dermal Virus	S1	S2	S3	Dermal Virus	S1	S2	S3	Dermal Virus	S3
1	64	32	32	64	0	32	32	64	64	0	0	0	64	8
5	64	8	32	128	0	8	32	128	64	0	0	8	64	0
6	32	4	16	64	0	8	16	64	32	0	0	8	32	0
8	32	4	128	64	0	8	128	64	32	0	0	0	32	8

Figures = highest dilution of serum in which definite flocculation occurred
0 = no flocculation in dilution 1: 8
Serum (0.3 c.c.) absorbed with 1.2 c.c. of 1–10 suspension of washed and packed bacteria (centrifugated 2,000 r.p.m. for 20 minutes)
Serum (0.5 c.c.) absorbed with 2.0 c.c. of 1: 20 suspension dermal virus
Absorption for 1 hour at 37° C.

The serum of every rabbit which we have examined, some 2 dozen in all, contains agglutinins, occasionally in dilutions as high as 1:128, for one or more of 8 or 10 strains of bacteria, mostly staphylococci, isolated from rabbit skin and dermal (rabbit) vaccinia virus. Furthermore, when dermal virus is used for immunization, the titer of the serum for some of these staphylococci is frequently raised, due to their presence in the crusts from which the suspensions for injection are prepared. The rabbits (5 in number) immunized with brain virus, free of ordinary bacteria, have all yielded an unchanged titer for these organisms, following the course of immunization.

The results of absorption tests with 3 different strains of staphylococci (S1, S2, and S3) and 4 anti-vaccinia flocculating serums are given in Table III. The results lead to the conclusion that the flocculation obtained with vaccinia virus, either dermal or brain, is specific. Removal of the antibodies for the staphylococcus strains did not affect the flocculating properties of the serum for the virus. On the other hand, removal of the vaccinia antibodies by absorption with dermal virus left the agglutinins and precipitins for the staphylococci unchanged.

The experiments further show that, as Smith[9] has observed, viruses behave in the same way as bacteria in respect to the specific absorption of antibodies. There is one difference, however, which may be more apparent than real, although it has been noted by other observers, such as Burgess, Craigie and Tulloch,[2] and Andrewes,[10] as well as

Smith. This is in the seemingly large amount of vaccinia antigen required for complete removal of the antibodies, even from a serum of comparatively low titer. We have observed that under conditions of our experiments, approximately 0.1 gm. of dried dermal virus (potency 1:8,000) or 2 c.c. of 1:20 centrifuged suspension is required to absorb completely the flocculating antibodies from 0.5 c.c. of serums which have a titer of 1:32–1:64. Compared with the number of bacteria required for complete absorption of specific agglutinins from antibacterial serums many times more active than anti-vaccinia flocculating serum, the amount of virus required for absorption of the latter seems excessively large.

We may assume, however, that in a virus of a potency such that 0.05 c.c. of a 1:8,000 dilution is the smallest amount which will produce a lesion after intradermal injection, the specific antigen present is a very small part of the whole and may be comparable to the amount necessary for absorption in the case of bacterial agglutinins.

Effect of Varying Concentrations of Antigen—That optimum concentrations of antigen for flocculation exist is indicated by the results with a brain virus recorded in Table IV. It is seen that concentrations greater than 1:50 failed to flocculate, whereas the best results were obtained with concentrations around 1:100.

TABLE IV

EFFECT OF VARYING CONCENTRATIONS OF ANTIGEN (BRAIN VIRUS) ON FLOCCULATION BY ANTI-VACCINIA SERUM

Antigen Dilution	Serum No. 2				Serum No. 5				Serum No. 8				Serum No. 9			
	1:8	1:16	1:32	1:64	1:8	1:16	1:32	1:64	1:8	1:16	1:32	1:64	1:8	1:16	1:32	1:64
1:5	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
1:10	−	− −	−	−	−	−	−	−	−	−	−	−	−	−	−	−
1:20	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
1:50	++	+	−	−	+	+	−	−	++	+	+	+	++	++	++	−
1:100	++	++	−	−	++	++	++	−	++	++	++	++	++	++	++	+
1:200	++	++	−	−	++	++	+	−	++	++	++	+	++	++	+	+
1:500	+	+	−	−	+	+	−	−	++	++	++	−	+	+	−	−
1:1,000	+	+	−	−	+	+	−	−	++	+	−	−	+	−	−	−
1:2,000	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−

Diagnostic Tests with Scabs from Chicken Pox and Smallpox Patients—In Table V are given the results of flocculation tests with 42 specimens collected from clinical cases of smallpox, vaccinia and chicken pox. Material was obtained from 28 cases of chicken pox, 9 cases of smallpox and 5 human vaccinations. The scabs were prepared for the tests according to the method already described for the

TABLE V

FLOCCULATION TESTS WITH SCABS FROM CLINICAL CASES OF SMALLPOX AND CHICKEN POX

No. of Specimen	Clinical Diagnosis	Age	Race	Sex	Anti-Vaccinia Serum									Normal Rabbit Serum			Salt Sol.
					No. 3			No. 6			No. 8						
					1:8	1:16	1:32	1:8	1:16	1:32	1:8	1:16	1:32	1:8	1:16	1:32	
1	Chicken pox	10	W	M	+	+	−	0	0	0	0	0	0	++	++	+	−
2	Chicken pox	6	W	F	+	+	+	0	0	0	0	0	0	++	++	+	−
3	Chicken pox	4	W	F	+	+	−	0	0	0	0	0	0	++	+	+	−
4	Chicken pox	12	W	M	−	−	−	0	0	0	0	0	0	−	−	−	−
5	Chicken pox	13	W	M	++	+	−	0	0	0	0	0	0	+	+	−	−
6	Chicken pox	9	W	M	++	+	+	0	0	0	0	0	0	++	++	+	−
7	Vaccinia—human	30	W	M	++	++	++	++	+	+	++	+	+	−	−	−	−
8	Chicken pox	8	W	M	−	−	−	0	0	0	0	0	0	−	−	−	−
9	Smallpox	24	C	F	++	++	++	++	++	+	+	+	±	±	−	−	−
10	Chicken pox	7	C	F	−	−	−	0	0	0	0	0	0	−	−	−	−
11	Chicken pox	5	W	M	0	0	0	+	+	+	+	+	+	+	+	+	−
12	Chicken pox	8	W	M	0	0	0	+	+	−	−	−	−	+	+	−	−
13	Chicken pox	9	W	F	−	−	−	+	+	+	++	++	+	++	++	+	−
14	Chicken pox	6	C	F	0	0	0	−	−	−	−	−	−	−	−	−	−
15	Chicken pox	8	C	F	0	0	0	−	−	−	−	−	−	−	−	−	−
16	Smallpox	27	C	M	++	++	++	++	++	++	++	++	++	−	−	−	−
17	Smallpox	32	W	M	++	++	++	++	+	+	++	++	+	++	++	−	−
18	Chicken pox	4	W	M	−	−	−	−	−	−	±	−	−	+	−	−	−
19	Chicken pox	10	W	M	−	−	−	−	−	−	−	−	−	−	−	−	−
20	Chicken pox	5	W	M	−	−	−	+	−	−	±	−	−	±	−	−	−
21	Chicken pox	6	W	M	−	−	−	−	−	−	−	−	−	−	−	−	−
22	Vaccinia—human	7	W	F	++	++	+	+	+	+	++	++	+	−	−	−	−
23	Chicken pox	7	W	F	+	+	−	++	++	−	++	+	−	++	++	+	−
24	Chicken pox	7	W	F	++	+	−	−	−	−	−	−	−	++	++	+	−
25	Chicken pox	6	W	F	−	−	−	−	−	−	−	−	−	−	−	−	−
26	Chicken pox	7	W	M	−	−	−	−	−	−	−	−	−	−	−	−	−
27	Chicken pox	8	W	F	−	−	−	−	−	−	−	−	−	−	−	−	−
28	Chicken pox	8	W	M	0	0	0				−	−	−	−	−	−	−
29	Chicken pox	7	W	F	0	0	0	−	−	−	−	−	−	−	−	−	−
30	Chicken pox	7	W	F	0	0	0	−	−	−	−	−	−	++	++	++	−
31	Chicken pox	1	W	M	0	0	0	−	−	−	−	−	−	++	++	+	−
32	Chicken pox	10	W	M	−	−	−	−	−	−	−	−	−	++	++	−	−
33	Smallpox	52	W	F	++	++	++	++	++	++	++	++	++	−	−	−	−
34	Smallpox	37	W	F	++	++	++	++	++	++	++	++	++	++	+	−	−
35	Smallpox	41	W	F	++	++	++	++	++	++	++	++	++	+	−	−	−
36	Smallpox	44	W	M	++	++	++	++	++	++	++	++	++	+	−	−	−
37	Smallpox	38	W	M	++	++	++	++	++	++	++	++	++	++	+	+	−
38	Smallpox	36	W	F	++	++	++	++	++	++	++	++	++	++	++	+	−
39	Chicken pox	2	W	M	++	++	++	++	+	+	+	+	−	++	++	++	−
40	Vaccinia—human	20	W	F	++	++	++	++	++	++	++	++	++	+	±	±	−
41	Vaccinia—human	25	C	M	++	++	++	++	++	++	++	++	++	+	+	±	−
42	Vaccinia—human	50	C	M	+++	+++	+++	+++	+++	++	+++	++	++	+	+	−	−

0 = test not made
− = no visible flocculation
+++ = heavy precipitate; ++ = moderate; + = light but definite; ± = very slight precipitation

preparation of the antigens. Whenever there was sufficient material it was tested against 3 flocculating serums in addition to normal rabbit serum, but in several instances there was sufficient antigen for tests with only 1 or 2 serums. The tests were incubated at 37° C. and read at intervals, the results recorded in Table V being those obtained at the end of 24 hours.

While the series is small, certain facts are apparent. In the first place, 10, or 35 per cent of the tests with chicken pox material, were positive with one or more of the anti-vaccinia serums. That the flocculation which occurred was nonspecific is indicated by its occurrence also in the tubes containing normal serum.

TABLE VI

AGGLUTINATION OF STAPHYLOCOCCI FROM CHICKEN POX SCABS BY RABBIT SERUMS

Culture	Serums										
	N 2	V 1	V 2	V 3	V 4	V 5	V 6	V 7	V 8	V 9	Salt Solution
24–4	32	32	32	—	16	8	32	32	32	32	—
32–1	16	4	16	—	8	8	32	16	16	16	—

N 2 = Serum of normal rabbit. For description of other serums see Tables I and II
Figures refer to highest dilution of serum in which definite clumping occurred

The tests with smallpox and vaccinia scabs were all strongly positive but in 4 instances (17, 34, 37 and 38) flocculation occurred with normal serum to such an extent as to throw doubt on the specificity. The frequency with which flocculation occurred in normal rabbit serum is in striking contrast to the results obtained with rabbit virus and is apparently contrary to the clear-cut results of the series reported by Burgess, Craigie and Tulloch. The reaction, as a diagnostic procedure, with the technic used, becomes valueless, due to the difficulty of interpreting the results.

Effect of Concomitant Bacteria on Specificity of Result—In view of the presence in rabbit serum of agglutinins for certain staphylococci, it was thought that this might be the cause of the nonspecific flocculation so frequently encountered. To test this possibility, cultures were

TABLE VII

ABSORPTION EXPERIMENTS WITH STAPHYLOCOCCI FROM CHICKEN POX SCABS

Antigen	Source	Unabsorbed Serum				Absorbed with 24–4				Absorbed with 32–1				Salt Sol.
		V 4	V 5	V 8	N 2	V 4	V 5	V 8	N 2	V 4	V 5	V 8	N 2	
24 C	Chicken pox scabs....	24	6	—	24	—	6	—	—	—	6	—	—	—
31 C	Chicken pox scabs....	6	0	—	12	—	0	—	6	6	0	—	—	—
32 C	Chicken pox scabs....	12	0	—	6	—	0	—	12	6	0	—	6	—
24–4	Staphylococcus culture from 24 C.....	12	6	24	24	—	—	—	6	12	6	12	24	—
32–1	Staphylococcus culture from 32 C.....	12	12	24	24	—	—	—	12	—	—	—	—	—
17 S	Smallpox scabs.....	24	48	24	24	24	48	24	—	24	48	48	—	—
Brain	Rabbit brain virus....	24	24	24	—	24	24	24	—	24	24	24	—	—
Dermal	Rabbit dermal virus ..	24	24	24	12	24	24	12	—	24	24	48	—	—

N 2 = Serum of normal rabbit. For serums Nos. 4, 5 and 8 see Tables I and II
Figures refer to highest dilution of serum in which definite flocculation occurred
— = no precipitation in dilution 1: 6
0 = not tested

made from suspensions of several smallpox and chicken pox scabs and representative staphylococci isolated were tested with the rabbit serums which we have used. The results with 2 strains which were most universally agglutinated are given in Table VI. All but one of the serums agglutinated these 2 cultures (24–4 and 32–1), some in comparatively high titer.

Table VII summarizes the results obtained when three anti-vaccinia serums and one normal rabbit serum were absorbed with suspensions of chicken pox scabs and with cultures of staphylococci isolated from them. It is seen that when the serums were so absorbed the titer for the homologous culture and suspension was reduced, while the flocculating properties for a smallpox antigen (17 S) and for vaccinia virus were not affected.

Effect of Incubation Time on Specific Flocculation—The results of the tests presented in Table V are the readings obtained after 24 hours' incubation. It was noted that frequently flocculation had occurred after only 1 or 2 hours in the water bath, particularly in the lower dilutions of serum. In Table VIII are presented the results obtained after different incubation periods with 16 antigens and 3 immune

TABLE VIII

RATE OF FLOCCULATION OF DIFFERENT ANTIGENS

Antigen	1 hr.				2 hr.				4 hr.				18 hr.			
	Serum				Serum				Serum				Serum			
	4	6	8	N	4	6	8	N	4	6	8	N	4	6	8	N
Rabbit dermal	–	–	16	–	8	16	16	–	16	32	32	–	16	32	32	–
Brain 2	16	–	–	–	16	–	8	–	16	–	16	–	64	16	64	–
Brain 4	0	8	16	–	0	32	32	–	0	32	32	–	0	32	64	–
22 V	–	–	–	–	–	–	–	–	–	–	–	–	32	16	32	–
17 S	8	16	–	–	32	16	16	–	32	16	16	–	32	32	32	–
33 S	8	0	8	–	16	0	16	–	32	0	32	–	32	0	64	–
34 S	–	0	8	–	–	0	16	–	–	0	16	8	32	0	32	16
35 S	–	–	–	–	–	–	–	–	–	–	–	–	32	32	32	8
37 S	8	16	16	–	16	32	32	16	16	32	32	16	32	32	64	32
38 S	8	16	16	8	8	32	16	16	32	32	32	16	32	32	64	32
23 C	–	0	–	–	8	0	–	–	16	0	–	–	16	0	32	16
32 C	–	0	–	–	8	0	8	8	16	0	16	16	16	0	32	16
39 C	–	–	–	–	–	–	–	8	8	8	8	16	32	32	16	32
40 V	–	–	–	–	8	–	8	8	32	16	32	8	32	32	32	16
41 V	–	–	–	–	8	8	8	8	16	16	16	8	64	64	64	16
42 V	8	8	8	–	32	32	32	8	32	32	32	8	64	64	64	16

Figures refer to highest dilution of serum in which flocculation was apparent
0 = test not made
For sources of antigens see Table V
For description of serums see Tables I and II. N = normal rabbit serum

serums. After incubation for 1 hour, flocculation had occurred in one or more tubes with at least 1 immune serum in the case of 9 vaccinia and smallpox antigens, while no flocculation had appeared with 4 antigens. Only 1 antigen (38 S) had flocculated in normal rabbit serum and this was in the first dilution only (1:8). None of the chicken pox antigens flocculated, although they were chosen because of their ability to flocculate well in normal rabbit serum. After 2 hours' incubation all but 2 of the vaccinia and variola antigens had flocculated but 5 had started to flocculate in the normal serum also, and the chicken pox antigens had begun to show precipitation. After 4 hours, the nonspecific flocculation had increased, and after 18 hours only 6 antigens were negative in the normal serum, while the chicken pox suspensions had flocculated in each of the serums tested.

TABLE IX

FLOCCULATION TESTS WITH INCREASING DILUTIONS OF ANTIGENS

Antigen	Source	Dilution of Antigen *											
		1 : 100			1 : 200			1 : 500			1 : 1,000		
		Serum			Serum			Serum			Serum		
		6	8	N	6	8	N	6	8	N	6	8	N
D 3	Rabbit dermal virus, 3d passage	32	32	–	32	32	–	32	32	–	32	32	–
B 2	Rabbit brain virus	32	64	–	32	32	–	32	32	–	16	8	–
7	Vaccinia—human	32	32	–	32	32	–	16	8	–	16	–	–
22	Vaccinia—human	32	32	–	32	32	–	16	32	–	8	8	–
40	Vaccinia—human	32	64	32	32	64	32	32	64	16	32	64	16
41	Vaccinia—human	32	64	16	32	64	16	32	64	16	32	64	8
42	Vaccinia—human	32	64	16	32	64	16	32	64	16	32	64	8
9	Smallpox	32	32	8	32	32	–	32	8	–	16	8	–
16	Smallpox	32	32	16	32	32	8	32	32	–	8	–	–
17	Smallpox	32	32	–	32	32	–	32	32	–	16	8	–
33	Smallpox	32	32	–	32	32	–	32	32	–	32	32	–
34	Smallpox	32	32	8	32	32	8	32	32	–	32	32	–
35	Smallpox	32	32	8	32	32	–	32	32	–	32	32	–
37	Smallpox	32	64	16	32	32	16	32	32	16	32	32	16
38	Smallpox	32	64	16	32	32	16	32	32	16	32	32	16
11	Chicken pox	16	16	16	16	16	16	16	16	16	–	–	–
12	Chicken pox	16	–	16	16	–	16	–	–	8	–	–	–
13	Chicken pox	16	32	32	16	16	16	16	16	16	–	–	8
23	Chicken pox	16	16	32	16	16	32	8	–	16	–	–	8
32	Chicken pox	–	–	16	–	–	16	–	–	8	–	–	8
39	Chicken pox	32	16	32	32	–	16	–	–	16	–	–	8

* Based on turbidity of 1: 100 suspension of brain virus
N = Normal rabbit serum
For description of serums 6 and 8 see Tables I and II
Figures refer to highest dilution of serum yielding definite flocculation

Effect of Dilution of Antigen on Specificity—Tests have also been made with increasing dilutions of antigens. Parallel tests with 1:100, 1:200, 1:500 and 1:1,000 dilutions of 15 vaccinia and variola antigens and 6 chicken pox antigens are presented in Table IX. The results are those obtained after 18 hours' incubation at 37° C. It is readily apparent that dilution of the suspensions of chicken pox scabs to 1:1,000 yielded negative results, while the vaccinia and variola antigens still flocculated, most of them as strongly as in lower dilutions. The results with normal rabbit serum were more consistently negative than in the lower dilutions.

Development of Precipitins in Human Serum—Since the vaccinated rabbit responds with the appearance of specific precipitins in its serum, the question arose whether the serum of vaccinated persons also acquired this property. Observations have been made on 4 persons (Table X), never vaccinated before, with the exception of No. 4, who gave a doubtful history of a successful vaccination 20 years ago. In all the vaccination followed a typical course. Specimens of their blood were obtained at the time of vaccination, on the 10th day following, and from 3, on the 17th day. Each serum was set up with a rabbit brain vaccinia suspension (1:200) of which the potency was 1:175,000, and in each instance, also, with a 1:200 suspension of a normal rabbit brain. It is seen that the serum of each individual

TABLE X

PRECIPITIN PRODUCTION IN THE SERUM OF VACCINATED PERSONS

Dilution of Serums	No. 1						No. 2						No. 3						No. 4			
	Day of Vaccination						Day of Vaccination						Day of Vaccination						Day of Vaccination			
	0		10		17		0		10		17		0		10		17		0		10	
	No. 3	N	No. 3	N	No. 3	N	No. 3	N	No. 3	N	No. 3	N	No. 3	N	No. 3	N	No. 3	N	No. 3	N	No. 3	N
8	+	−	++	−	++	±	−	−	+	−	+	−	−	−	++	−	++	+	+	−	++	−
16	−	−	++	−	++	−	−	−	+	−	+	−	−	−	+	−	++	−	−	−	+	−
32	−	−	+	−	++	−	−	−	+	−	+	−	−	−	+	−	+	−	−	−	−	−
64	−	−	−	−	++	−	−	−	−	−	−	−	−	−	−	−	+	−	−	−	−	−
128	−	−	−	−	+	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
256	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
Salt sol.	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−

No. 3 = Rabbit brain virus. No. 3—1: 200 suspension
N = Normal rabbit brain 1: 200 suspension
Tests read after 4 hours' incubation in water bath at 37° C.

showed, following the vaccination, an increasing titer, from 1:8 or less, to a maximum, on the 17th day, of 1:64, and in 1 case 1:128.

In addition to these observations on the appearance of precipitins following vaccination, the serums of 19 immune persons have been tested for the presence of flocculating properties. All were vaccinated at the time the blood was obtained, with the exception of No. 9, who refused, and No. 22 and No. 23, who were convalescent from smallpox. The results are summarized in Table XI. The serums of 5 persons apparently contained precipitins for normal rabbit brain tissue, 1 (No. 19) yielding a precipitate in 1:16 dilution of the serum, the others in 1:8. Only 3 of the immune persons gave entirely negative results, but since the serum of 1 of the non-immunes (No. 1) flocculated the virus in a dilution of 1:8, it is questionable whether results in such low dilutions are significant. On the other hand, the serum of 1 person (No. 12), who was successfully vaccinated 20 years ago, flocculated in a dilution of 1:64, as high a titer as the serums of the smallpox convalescents. It seems obvious, at least, that a negative flocculation test cannot be taken as an indication of lack of immunity.

DISCUSSION

The experimental evidence obtained is in support of previous observations of other workers who have concluded that vaccinia virus behaves like bacterial antigens in the production of antibodies. It is difficult to explain the clear-cut results with uncontaminated brain antigen in any other way. The experiments in which the agglutinins for concomitant bacteria in dermal virus were absorbed from the serum without affecting its flocculating value for vaccinia virus corroborate this view. Furthermore, the experiments of Maitland and Laing,[11] who obtained positive complement fixation with pure cultures of vaccinia virus, can hardly be considered otherwise than as an example of specific antigen—antibody union.

An explanation for the negative results which have been reported may be found, in certain instances at least, in differences of technic. Concentrations of antigen greater than a certain optimum dilution may prevent visible flocculation. While we have in the work reported here held to certain definite dilutions of the antigens, the impression has been gained that, in the case of most antigens, dilution to the point of opalescence, rather than a definite turbidity, yields the most satisfactory results. No exact statement can be made, because the original concentration of virus in the material used can be determined only by animal inoculation.

The ring test, in our experience, does not produce such consistent

TABLE XI

FLOCCULATION TESTS WITH HUMAN SERUMS AND VACCINIA VIRUS

No.	Age	Race	Sex	Vaccination History	Result of Vaccination	Rabbit Brain Virus (1 : 200)						Normal Rabbit Brain (1 : 200)	
						Dilution of Serum							
						1 : 8	1 : 16	1 : 32	1 : 64	1 : 128	1 : 256	1 : 8	1 : 16
1	20	W	F	Never vaccinated (Table X)	Typical vaccinia	+	−	−	−	−	−	−	−
2	30	C	M	Never vaccinated (Table X)	Typical vaccinia	−	−	−	−	−	−	−	−
3	52	C	M	Never vaccinated (Table X)	Typical vaccinia	−	−	−	−	−	−	−	−
4	23	W	F	20 yrs. ago? (Table X)	Typical vaccinia	+	−	−	−	−	−	−	−
5	27	W	M	11 yrs. ago	Immune reaction	+	−	−	−	−	−	−	−
6	28	W	F	9 yrs. ago	Immediate reaction	+	−	−	−	−	−	+	−
7	30	W	M	24 yrs. ago	Immediate reaction	+	+	−	−	−	−	+	−
8	18	W	M	10 yrs. ago	Immediate reaction	+	−	−	−	−	−	−	−
9	30	W	F	Smallpox 27 yrs. ago	Refused	−	−	−	−	−	−	−	−
10	27	W	F	10 yrs. ago	Immune reaction	−	−	−	−	−	−	−	−
11	22	W	F	15 yrs. ago	Immune reaction	+	+	−	−	−	−	−	−
12	25	W	F	20 yrs. ago	Immediate reaction	++	++	+	+	−	−	+	−
13	28	W	F	20 yrs. ago	Immediate reaction	+	+	−	−	−	−	−	−
14	24	W	F	7 yrs. ago	Immediate reaction	+	+	−	−	−	−	−	−
15	29	W	F	6 yrs. ago	Immediate reaction	+	−	−	−	−	−	−	−
16	24	W	F	13 yrs. ago 4 yrs. ago	Immediate reaction	+	+	−	−	−	−	−	−
17	21	W	F	4 yrs. ago	Immediate reaction	+	+	−	−	−	−	−	−
18	35	C	M	15 yrs. ago	Immediate reaction	−	−	−	−	−	−	−	−
19	36	W	M	13 yrs. ago	Immediate reaction	++	++	+	−	−	−	++	+
20	24	W	F	10 yrs. ago	Immune reaction	++	−	−	−	−	−	−	−
21	38	W	M	35 yrs. ago	Immediate reaction	+	+	−	−	−	−	−	−
22	42	W	M	Convalescent from smallpox		++	++	+	−	−	−	−	−
23	38	W	F	Convalescent from smallpox		++	++	++	+	−	−	+	−

Incubation at 37° C. for 4 hours

results, nor in such high dilutions of serum, as does the flocculation technic. This observation might be interpreted as constituting evidence that the reaction is akin to agglutination rather than precipitation; however, a definite statement is impossible and probably unimportant.

When we come to the application of the reaction as a practical test for the differential diagnosis of smallpox and chicken pox, our experience is discouraging. The occurrence of agglutinins in many rabbit serums for strains of staphylococci found in human chicken pox and variolous material confuses the result, in many cases due to agglutination of these organisms in the normal rabbit serum controls. That Burgess, Craigie and Tulloch encountered the same difficulty in their series is indicated by their statement, "We have on four occasions observed a peculiar reaction to occur when crust extracts have been exposed to rabbit serum, both anti-vaccinia and normal." They claim, however, that the nonspecific reaction which they observed was easily differentiated from the specific precipitation by the size and looseness of the clumps. However this may be, the number of such reactions in our series is apparently larger than theirs and the clumps were sufficiently similar, both in size and character, to the specific clumps, as to make differentiation difficult, if not impossible.

The results obtained in the rather small series where the effect of serial dilutions of the antigens was compared are more encouraging. The observations, though limited in number, indicate that in most cases, at least, at a dilution where the concomitant bacteria fail to give a reaction, the virus is still present in sufficient quantity to cause definite flocculation. Further observations are being made to determine this point.

The results obtained when rabbit neuro-vaccine was tested against human immune serum are entirely analogous to those obtained with immune serum prepared in the rabbit. The results in Table XI indicate that the flocculating properties of the serum do not persist so long as the immunity to the disease, and are therefore not indicative of the immunity status. The vaccinated individuals, whose serum reactions are given in Table X, are being followed to determine how long the reaction persists. The fact that these serums flocculated the virus as early as the 10th day after vaccination, i.e., about the 7th day of the disease, raises the possibility that this early appearance of precipitins may be utilized as a diagnostic aid in the human disease.

SUMMARY

Experimental evidence indicates that the intradermal or intra-

venous inoculation of vaccinia virus in rabbits is followed by the appearance of specific flocculating properties in their serum.

Vaccination of the human subject stimulates the production of precipitins against vaccinia virus. The serum of 4 persons acquired this power to flocculate the virus as early as the 10th day following vaccination.

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Milk Consumption and the Growth of School Children

UNDER the auspices of the Department of Health for Scotland, 10,000 children in the Lanarkshire schools were given ¾ pint of raw or pasteurized milk every day from February to June, 1930, and compared with 10,000 other children not so favored.

The result, as in similar but less extensive tests in previous years, showed a definite increase in the rate of growth of the milk-fed group. This increase was the same for raw and pasteurized milk. There was no obvious difference between boys and girls, and little evidence of definite relation between the age of the children and the amount of improvement.

Once again the unsurpassed value of pure milk as the chief contributor to the healthy growth of school children has been demonstrated. Whatever else may be said about the alleged thrift of the Scotch, they have been generous in the nourishment of these children of school age. Their example is worthy of universal emulation.—Gerald Leighton and Peter L. McKinlay, Edinburgh, H. M. Stationery Office, 1930. Abst. James A. Tobey.

Smoke Eradication to Save the Health Value of Urban Sunshine*

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THE loss of the shorter ultra-violet rays of sunshine, due to atmospheric pollution, is beginning to be recognized as a health problem of cities.

That the loss is constant and of sufficient proportions to be of health concern is indicated by recent studies in several American cities. In Chicago, both by spectrographic[1] and chemical methods,[2] a decided loss of short rays and actinic intensity was shown during most of the year and an unusually long period of low ultra-violet light in sunshine (7 months) was demonstrated. More recent studies in Chicago[3] have shown that smoke is a very significant factor in the loss of actinic rays, even in summer, the season of minimum combustion of fuel.

In Baltimore, Shrader, Coblentz, *et al.*[4] reported a loss of about 50 per cent in solar ultra-violet light as determined by actinic methods.

In New York City, Ives,[5] in a study of sunshine measured by the photoelectric cell, showed a loss of 50 per cent in visible light, without respect to ultra-violet light.

Efforts to abate the smoke of ordinary fuels to a sufficient degree to save the ultra-violet light of sunshine have thus far proved inadequate. The results have been apparent in greater visibility, cleanliness and economy of fuel rather than in material saving of ultra-violet light.

In Pittsburgh,[6] an intensive 10-year program of smoke abatement by forced draught combustion methods succeeded in reducing the visible smoke due to unburned tarry matter, but increased the total deposit of dust particles in the air about 40 per cent. Although the dust of ash particles, according to recent experiments,[4] is somewhat less opaque to ultra-violet light than that of soot and tarry matter, it is nevertheless definitely opaque, and the greatly increased amount of

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FIGURE I—The smoke problem in Chicago

ash dust would seem to offset the advantage of complete combustion by forced draught.

In Chicago one has only to look out over the downtown district from a loop tower or airplane on a bright summer day to realize the practical futility of control methods applied to the present combustion processes, with respect to conservation of ultra-violet light.

As seen from above, even when combustion is at its minimum, a vast cloud hangs almost continually over the city, the massed contributions of thousands of stacks, each contributing a little, but each for the most part innocent of violation of any sane and reasonable anti-smoke regulation.

It appears therefore that there is little hope of restoring the lost sunshine of cities by smoke control methods applied to the usual combustion processes.

A changed point of view is needed—a new objective to direct engineering thought toward a really effective solution of the problem as a whole, with its health aspects, as well as the esthetic and economic.

That objective, we believe, should be "smoke eradication" rather than "smoke control," and its motivation should place foremost and above all other considerations the needs of the public health. Its slogan should be: "Sunshine of full actinic value, for urban as well as rural populations. (1) To assure normal growth of children; (2) To build sound, straight teeth and strong bones; (3) To eradicate rickets in infants; and (4) To help maintain resistance to those diseases which attack when vitality is low."

FIGURE II—Two pictures taken at the same time from Foreman Tower: (1) View east toward lake. (2) View west toward Civic Opera Building

Figures III and IV are presented for study and critical analysis, rather than as a basis for any contention or conclusion. They offer data on the relation of (a) total deaths per month, and (b) deaths from acute respiratory disease per month, to (c) the total sunshine hours per month and (d) the erythema hours of sunshine per month, during 1926–1927 in Chicago.

FIGURE III—Relation of total deaths to erythema hours of sunshine per month in Chicago, 1926–1927

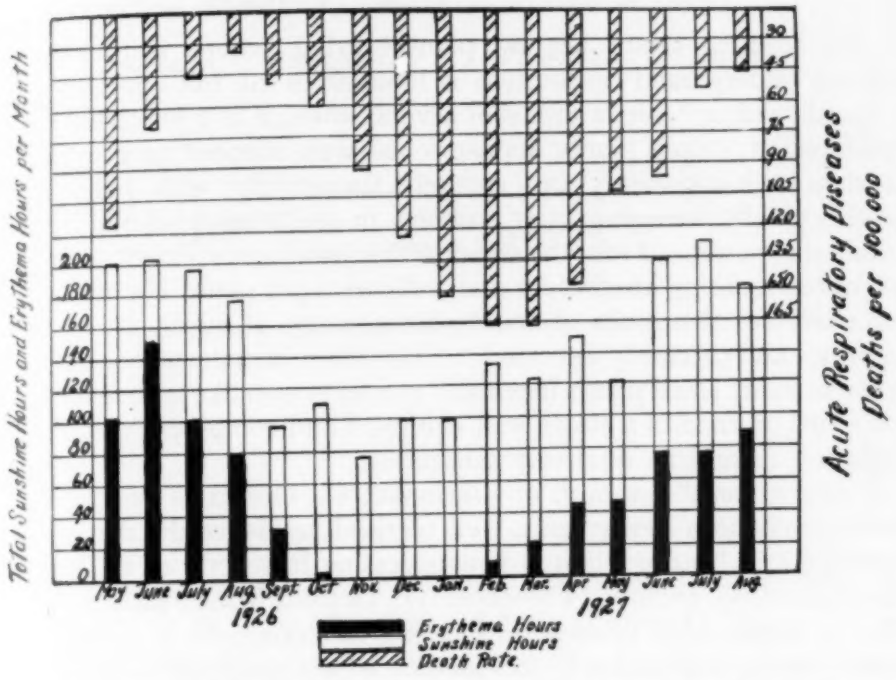

FIGURE IV—Relation of deaths from acute respiratory disease to erythema hours of sunshine per month in Chicago, 1926–1927

The striking feature of these charts is a remarkable correlation between respiratory disease deaths and erythema hours per month, which is not so obvious in any of the other relationships.

Low erythema hours are observed to be followed by high respiratory death rates with a "lag" of 1 to 2 months, and conversely the higher erythema hours per month are followed by correspondingly lower respiratory death rates, after a similar "lag."

THE REMEDY

What promise of really effective smoke eradication may we find in the present state of knowledge to save the sunshine of cities? As a basis for constructive thought and discussion of the practical possibilities, we present 3 suggestions to the engineering profession, which, if they are sound, may help to direct the trend of development.

1. Steam heating from a central plant, serving a large district as a public utility
2. Gas heating
3. Electric heating

THE CENTRAL STEAM HEATING PLANT

The central steam heating plant serving groups of buildings through underground connections is familiar to all, but operating as a "public utility" over a radius of several miles, it is a relatively new development. Such plants appear to be well adapted to congested districts and apparently can compete successfully with individual heating plants, through greater economy in operating costs and larger purchasing power. From the standpoint of smoke abatement, a single stack, representing an efficient and well managed plant, is a welcome substitute for thousands of small plants, many of which are poorly equipped and carelessly operated. Even the minimal smoke accumulation of many small plants inevitably produces a smoke pall, while the same fuel, burned in a single well equipped and competently fired installation, should be relatively innocuous.

"Mariemont," a suburb of Cincinnati, O., illustrates this type of development in a newly built, well planned residence district. The central steam heating plant is now operating in several of the larger American cities, including Cleveland, O., Detroit, Mich., Kansas City, Mo., St. Louis, Mo., Pittsburgh, Pa., and New York, N. Y. Progress toward smoke eradication by this method is necessarily slow and also it seems applicable only under special conditions. However, it deserves consideration as a potential method to be used in combination with the other available methods.

GAS HEATING

The use of both artificial and natural gas in heating and industrial processes is now on the threshold of wide development. Pipe lines are being extended from the natural gas fields to the larger cities, including Chicago. Gas heating appliances may be readily fitted into existing boiler equipment and by reason of automatic control and the elimination of handling, hauling, and storage costs, gas is beginning to compete with other fuels.

Gas combustion is practically complete. The products are gaseous in nature and should contain no ash or other solid particles. Theoretically, at least, the burned effluent of gas combustion should not occlude the ultra-violet light of sunshine. Heretofore, however, there have been no data on this point.

To make a practical test of the possible screening effect upon the actinic light rays of atmospheric accumulations from gas combustion on a large scale, experiments were recently conducted by us in Tulsa and Oklahoma City, Okla., and in Fort Worth and Dallas, Tex., which are essentially gas heated cities. The actinic method was used.[2]

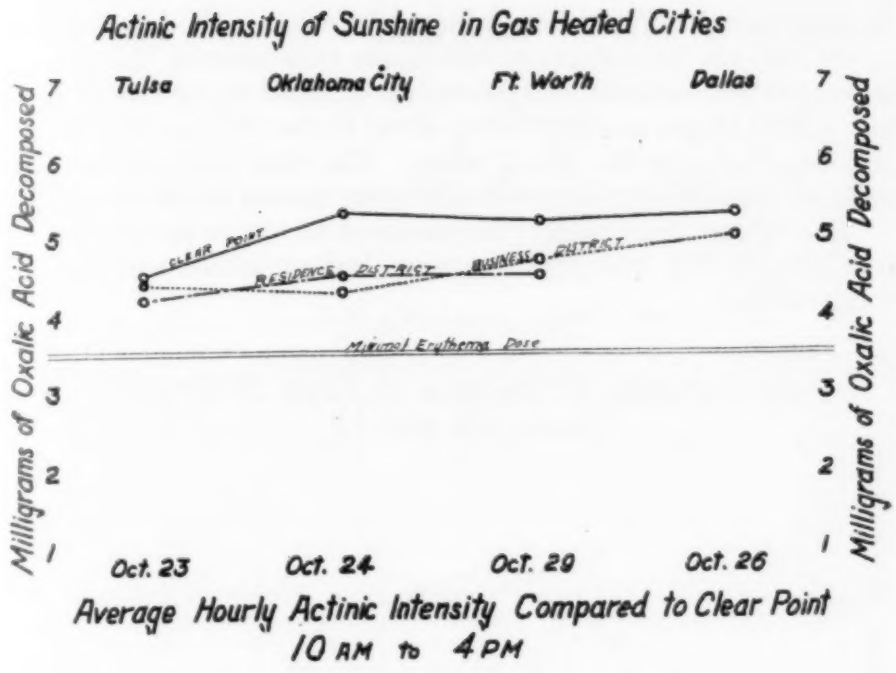

FIGURE V

Figure V shows the average hourly actinic readings between 10 A.M. and 4 P.M. standard time, in the residence and business sections of the 4 cities on clear days, as compared to simultaneous readings in the nearby country, the latter locations being designated as "clear points." The maximum and minimum daily temperatures during the tests ranged from 42–57° F. for Tulsa to 52–76° F. for Dallas.

Figure VI illustrates the hourly differences between the urban and rural readings for a single day in Tulsa, Okla. The noticeable actinic loss between 10 A.M. and 11 A.M. in the residential district was apparently due to coal smoke from locomotives in a railroad yard to the windward. At the next hour the testing station was shifted to the other side of the railroad and thereafter readings closely approximating those of the "clear point" were obtained.

Both charts are to be considered in comparison with Figure VII, representing the similar average findings by months in Chicago, especially from April to August inclusive, the season of minimal combustion for heating purposes.

In the southern cities the proportionate loss of actinic rays of erythemal intensity* from the smoke of gas combustion was very

* Actinic intensities of erythemal quality are those on or above the line indicating minimal erythema dose.

small compared to the loss in Chicago where coal is the principal fuel.

Of the gas heated cities, Oklahoma City showed the greatest actinic loss with an estimated percentage of about 80 per cent of buildings heated by gas as compared to about 90 per cent for Fort Worth, and 95 per cent for the other 2 cities. The other fuel used is principally oil, but considerable coal is still being burned in Oklahoma City.

In Tulsa an opportunity was presented to test an oil burning district (Figure VI) and here a greater loss of actinic sunshine was demonstrated.

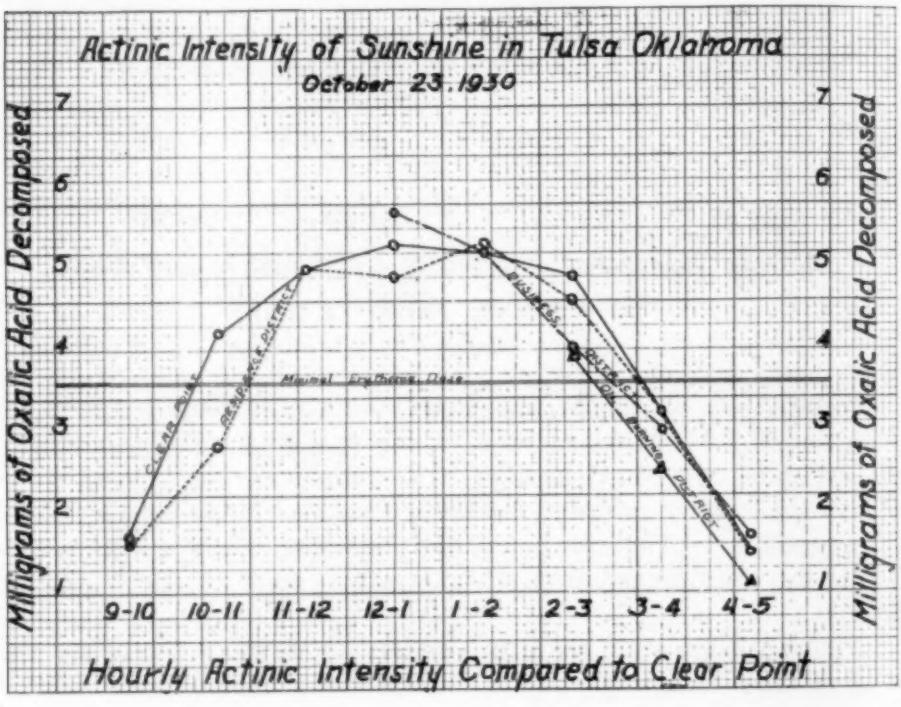

FIGURE VI

From the standpoint of smoke eradication, gas heating appears to offer greater promise of early relief than any of the other methods. It requires no revolutionary changes in building construction or heating equipment. It is equally applicable to old and new heating appliances. It can be placed in small and large plants alike. It may be extended rapidly, and brought to serve large areas within a relatively short time.

Possibly gas heating may not be the ideal ultimate solution of the smoke problem of cities, but it has the advantage of being already at hand. The possibilities of objectionable effects of accumulated gase-

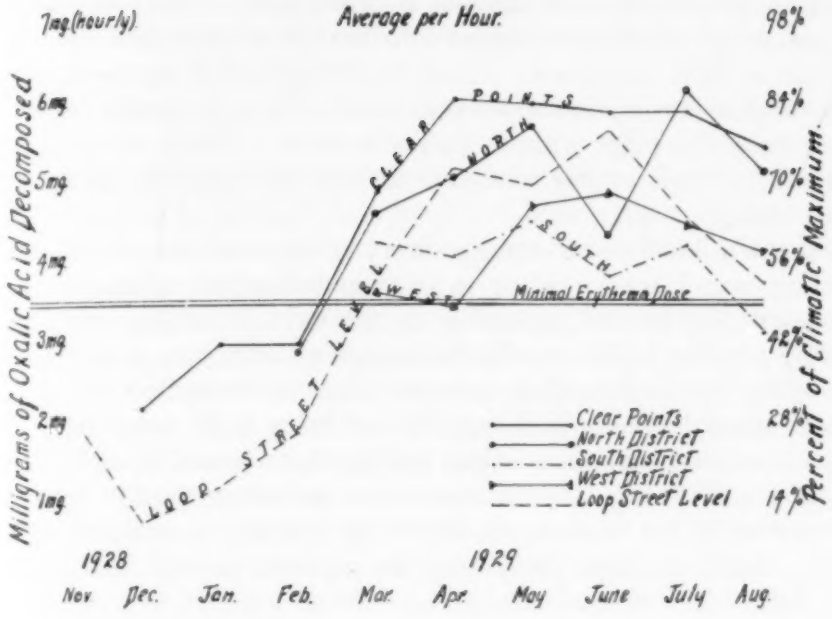

FIGURE VII—Average actinic intensities for four city districts and for clear points. Hourly observations between 11 a.m. and 3 p.m.

ous products of combustion in the atmosphere are yet to be studied, but in any case immediate and decided improvement is certain and a means is available of bridging the gap between the present highly objectionable combustion methods and slowly evolving methods of the future.

A new residential suburb "Sauganash" located in the northwestern section of Chicago is largely a community of gas heated homes. An airplane view of the project is shown in Figure VIII. It will be noted that there is no visible smoke emission from the gas heated homes in the foreground, but many smoke columns are to be seen in the city proper in the background.

ELECTRIC HEATING

Until recently, the prospect of electric heating as the ideal goal of heating methods seemed far remote and to be thought of only for our children's sake. The idea is highly attractive—cleanliness, convenience, complete absence of smoke; fuel burned at a distance from the city and converted into current; hydroelectric power developed to its maximum possibilities. From a health aspect the picture is perfect, and it appeared to be a trend consistent with previous development of electric light and power.

But the cost, we were advised, is prohibitive. The loss of energy in conversion of electric current into heat is greater than in its conversion to light and power. Coal cannot be burned at the mines unless an abundant water supply is at hand. Current cannot be carried more than 300 miles without excessive loss. "There is not enough potential electric energy available to heat the City of Chicago," we were told.

But who knows what compensatory saving there may be in electric heating, once it is established on an extended scale? Charges for fuel transportation by rail, unloading at the yard, reloading, cartage, repeated handling until it reaches thousands of individual plants, janitors shoveling coal and tending furnace, ashes to be hauled, repairs and maintenance, waste of fuel—smoke—all these leaks are costly. Perhaps in electric heating as in gas heating there would be added saving in quick availability—heat at once when and where needed, and saved at once where not needed—no loss in the building up or dying down of fires. Again perhaps there may be material saving in the "inter

Chicago Aerial Survey Co

FIGURE VIII—Sauganash

peak" usage of current supplied through regular channels for ordinary demands. And this brings us to the most recent offering in electric heating, and *again stirs hope!*

Figure IX shows a house heating plan utilizing electric current at "off peak" hours, 11 P.M. to 6 A.M., to heat a well insulated tank of water under pressure to a temperature of 250° F. Thence during the day hot water or hot air heat is delivered by automatic control throughout the house, and at a current cost aggregating but little more than the usual heating costs of a home!

A community of the better type of homes, electrically heated by this method, is now developing in Fort Wayne, Ind., where rate concessions for "off peak" current have been allowed.

In LaGrange, Ill., a suburb of Chicago, a single electrically heated home knocks at our door, awaiting similar rate concessions to make electric heating an actuality in the metropolitan area. A few years ago, it was a dream. Today electric heating is here. The prospective electrification of rail terminals and suburban roads is in line with the trend toward greater peaks and emphasizes the economic desirability of a market for "off peak" current.

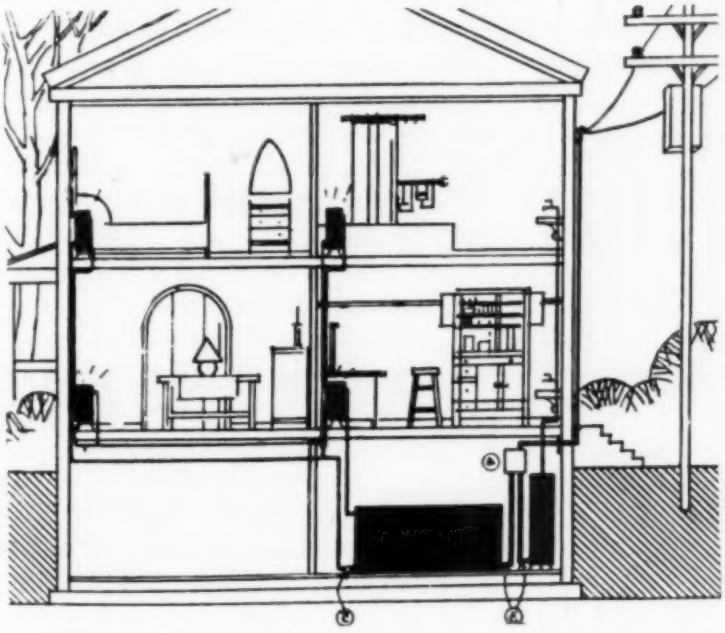

FIGURE IX—Plan of an electrically heated home utilizing "off peak" current

THE FUTURE

What a prospect—electric heating, gas heating and the central steam plant developing hand in hand, each seeking its most favorable outlet, according to its special fitness, electric heat to the finest suburban homes, gas heat to the city proper and to the industries, and central steam heating to the more congested districts. Smoke will be of the past, no longer a menace to health, robbing the children of needed sunshine.

Let us look for a moment toward the city of the future—clean with the cleanliness of health, with clean, invigorating air and undiminished sunshine, white buildings that stay white, clean linens, clean faces.

The health benefits of the country brought to the back yards of the most congested districts: Ruddy complexions like those of vacation days showing adequate dosage of ultra-violet light; healthy, normally growing children with even teeth, straight bones, and a high resistance to disease; a vigorous, active population of workers, producing effectively, living, working, enjoying—in an atmosphere of health.

Some day all this will be a reality. The basic knowledge just now coming to light will force the change, and no one can hold back or block its progress. But we, as health advisers, can speed the change and ourselves participate in its benefits. We can point the way. We can enlighten. We can fight for our convictions, to hasten the transition of the dingy, smoky city of today to the clean and healthful city of tomorrow.

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Diphtheria in North Carolina, 1920-1930, Inclusive

Year	Number	Rate per 100,000 population	Year	Number	Rate per 100,000 population
1920	286	11.1	1926	263	9.2
1921	365	13.9	1927	278	9.5
1922	510	19.2	1928	355	12.0
1923	331	12.3	1929	324	10.8
1924	323	11.8	1930	253 (Provisional)	7.8
1925	310	11.0			

What of the next few years? The rate for 1930 is lower than before, but 253 deaths is a terrible sacrifice to make to the little dirty gods of Ignorance and Carelessness.—*Health Bull.*, N. C. State Board of Health, Mar., 1931.

Challenge of Malaria in the South*

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ALL studies of the distribution, importance and trends of malaria with which I am familiar have involved consideration of methods for its measurement. No single method of measurement is ideal for use by the ordinary local health organization. Methods which can be employed by the malaria specialist are expensive, and unfortunately there are few real malariologists. As a consequence, accurate and full information is available only for limited areas and for brief periods. Where a systematic collection of all available data has been made, the malaria trends, as based upon personal histories, doctors' records, morbidity records, spleen examinations, blood examinations, and mortality records, are all in general corroborative.

Mortality records of malaria afford the only reasonably complete index available for the entire area of malaria importance. It is known that these records contain inaccuracies and are often misleading. Deaths from malaria contracted elsewhere are recorded in localities in which no transmission of the disease occurs. Again, malaria transmission may be important in a community, impairing the health and working efficiency of the inhabitants without actually causing deaths from the disease. Cities, counties, and other communities, however, which show an appreciable number of deaths of residents from year to year due to malaria can, as a rule, be regarded as having a malaria problem. It should be observed that the total number of deaths occurring in a state where malaria is restricted to a small area may be so few as to suggest that the disease is unimportant, and yet in communities where malaria does occur, it may be the major health problem. Although malaria has rendered many places uninhabitable, it has rarely reached such a degree of severity in this country—certainly this applies to the past decade or two.

In using mortality statistics as a basis for this discussion, it is believed that in spite of the inaccuracies and limitations of the statistics, they do give a true picture of trends over large areas. If a particular city or county were being studied to determine whether malaria consti-

* Read before the Public Health Engineering Section of the American Public Health Association at the Fifty-ninth Annual Meeting at Fort Worth, Tex., October 28, 1930.

tuted a public health problem warranting special administrative procedures against it, and if so, what procedures, the approach would have to be quite different. The focuses of infection and of quadrimaculatus breeding would have to be studied and their relations determined. The type of control measure to be applied in each area would depend on local conditions. In one locality drainage might be practicable, whereas in another screening or other measures would be chosen. Again, a combination of measures would be indicated. Our object here is to give merely a general indication of the nature and scope of the problem in the South.

In former years, when physicians were not so well trained as they are now and when laboratory facilities were not available, the errors of diagnosis must have been greater than at present, but the reporting was less complete. There have been cases where health authorities have found, on investigation, that deaths had been erroneously reported as due to malaria. Dr. Bassett, the health officer of Savannah, Ga., for example, has since 1923 investigated every death ascribed to malaria but in which the parasites had not been found in the blood. He has reported on about 20 autopsies which failed to reveal malaria as the cause of death. Tuberculosis he found to be the usual cause of death in this group, and there were deaths due to pneumonia and cirrhosis of the liver, and one to typhoid fever. Whether the rate of error in the records as to the causes of death is greater for malaria than for other diseases, it is difficult to say, but it is probable that since well trained physicians and diagnostic laboratories are increasing in number, the rate of error is diminishing from year to year. Moreover, the reporting is much more complete. After all, since we have no substitute basis for the general measurement of malaria, we proceed upon the basis of death rates, and I repeat that, as indicators of trends, it is believed that these rates are dependable.

Herewith is presented a series of tables and graphs giving the mortality from malaria by years and states for which it was practicable to collect data. A study of the tables and the corresponding graphs will give a fairly good picture of the malaria trends of the past decade. A few comments on the more significant factors will be given.

MALARIA DEATHS U. S. REGISTRATION AREA, 1910–1928

The graph for the malaria death rates for the United States Registration Area and the supporting figures (Figure I and Table I) are misleading, certainly for the period 1910–1918, because during this period only 9 of the 16 states classed as malarious were in the registration area, and in 1910 out of 16 states incriminated in an article by

TABLE I

MALARIA DEATHS PER 100,000 POPULATION FOR THE REGISTRATION AREA, 1910–1928, AND FOR NINE SOUTHERN STATES,[1] 1918–1929

Year	Rate for Registration Area	Nine Southern States		
		Population	Deaths	Rate
1910	2.2			
1911	2.4			
1912	2.6			
1913	2.1			
1914	1.9			
1915	1.7			
1916	2.9			
1917	3.0			
1918	2.9	21,131,143	3,634	17.2
1919	3.7	21,342,464	3,463	16.2
1920	3.4	21,553,786	3,453	16.0
1921	3.6	21,915,230	3,648	16.6
1922	3.5	22,276,674	3,134	14.1
1923	2.8	22,638,118	2,394	10.6
1924	2.4	22,999,562	2,023	8.8
1925	2.0	23,361,006	1,936	8.3
1926	1.9	23,722,450	1,833	7.7
1927	2.7	24,083,894	1,976	8.2
1928	3.6	24,445,338	2,510	10.3
1929		24,806,782	2,428	9.8

[1] Alabama, Florida, Louisiana, Mississippi, Missouri, North Carolina, South Carolina, Tennessee, Texas.

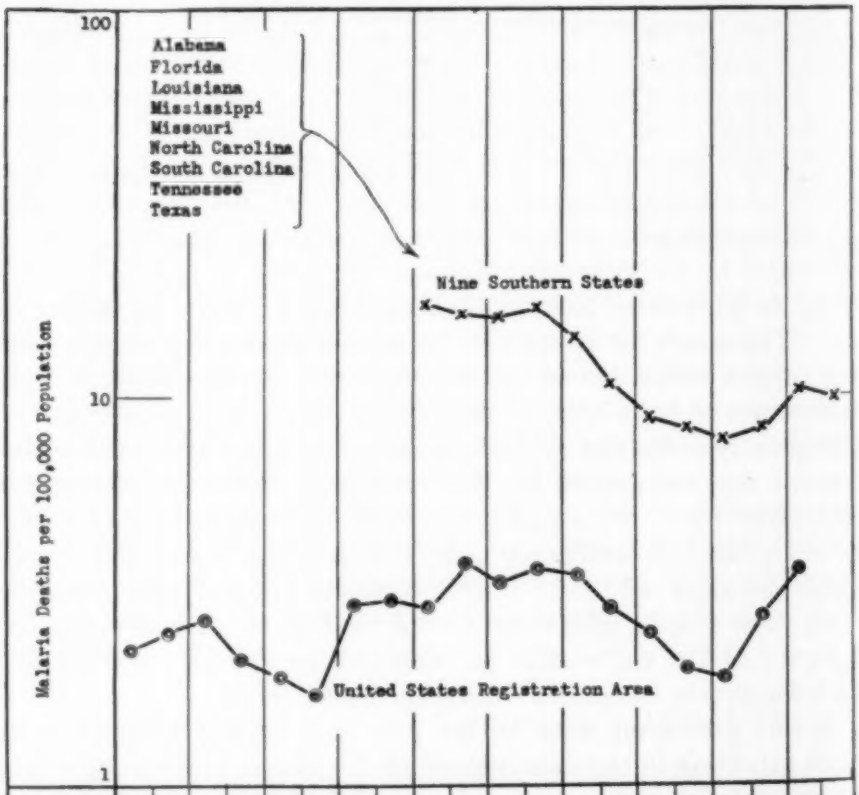
Maxcy, to be referred to later, California was the only one within this area. The graph for 9 states shown also in Figure I is undoubtedly a more correct indication of the malaria trend for the included states. There seems to have been a low point in the mortality curve in 1915. Subsequently either the rate increased yearly up to 1919–1920, or the apparent rise was caused by the addition of malarious states to the registration area. In any case, the 1919–1920 period, whether shown by the registration area graph or by that for the 9 states, was a period of high mortality, and 1925–1926 a period of low mortality. By comparing these graphs with those for the individual states, the degree of similarity of the curves can be observed, as can also the extent to which the curves have risen during the past 3 years.

Before presenting data for the individual states, it would be well to call attention to the excellent article by Maxcy[1] in which he found the case fatality to be about 0.5 per cent. Maxcy arbitrarily designated as malarious all counties which, for a 3-year period, 1919–1921, averaged over 1 death per 10,000 population. A list of the malarious counties by states and the mortality rate for each county are included.

Some of his county figures are quoted in Table V-A. We take the liberty to present his summary as Table I-A to which, for convenience, we have added the columns showing the total number of counties and inhabitants of each state. It will be noted that Maxcy's study incriminated 12,662,256 inhabitants of 520 counties in 16 states, all of which, except California, are in the southern, central, and southeastern part of the United States. The areas involved in some states are quite limited. For example, there were only 4 counties in California, 9 in Illinois, 6 in Kentucky, 11 in Missouri, and 6 in Virginia. Oklahoma had 20, whereas Alabama, North Carolina, South Carolina, and Tennessee had a range from 25 to 30 counties, and the following states had more extensive areas involved: Arkansas 52 counties, Florida 41,

FIGURE I

MALARIA DEATHS PER 100,000 POPULATION FOR THE U. S. REGISTRATION AREA, 1910–1928, AND FOR NINE SOUTHERN STATES,[1] 1918–1929



[1] K. F. Maxcy's article on Malaria, U. S. P. H. S. *Reprint No. 839*, May 25, 1923.

Georgia 70, Louisiana 55, Mississippi 74, and Texas 64. The percentage of the population involved ranged from 1 per cent in California, 3 per cent in Virginia, 3 per cent in Illinois, 5 per cent in Kentucky, 6 per cent in Missouri, to 92 per cent in Mississippi, 80 per cent in Florida, 75 per cent in Arkansas and 71 per cent in Louisiana. Reference to Table V-A will show 14 counties for Florida (1927–1929 period), 7 for Alabama (1926–1928 period), and 22 for Georgia (1928), which on the 1 death per 10,000 population basis would be classified as malarious, although not present in Maxcy's list.

Virginia—The malaria of public health importance in Virginia is found in the southeastern counties. Maxcy's study incriminated only

TABLE I-A

THE RELATIVE IMPORTANCE AND INTENSITY OF THE MALARIA PROBLEM IN CERTAIN STATES COMPARED, USING FOR COMPARISON ONLY THOSE COUNTIES HAVING FOR THE 3-YEAR PERIOD 1919–1921 AN AVERAGE DEATH RATE FROM THIS DISEASE OF OVER 1 PER 10,000 POPULATION (Taken from Maxcy's article, U. S. P. H. S. Reprint No. 839—May 25, 1923)

State	Total number of counties [1]	Total 1920 population [1]	Counties involved		Population involved		Deaths from malaria, 1919–1921	
			Number (a)	Per cent of total (b)	Number (c)	Per cent of total (d)	Average annual number (e)	Average annual rate per 10,000 [2] (f)
Alabama	67	2,348,174	29	43	864,408	37	155	1.80
Arkansas	75	1,752,204	52	69	1,321,402	75	639	4.84
California	58	3,426,861	4	7	37,341	1	9	2.41
Florida	67	968,470	41	76	771,304	80	329	4.27
Georgia	161	2,895,832	70	45	1,386,124	48	400	2.89
Illinois	102	6,485,280	9	9	183,496	3	37	2.02
Kentucky	120	2,416,630	6	5	119,192	5	29	2.43
Louisiana	64	1,798,509	55	86	1,285,524	71	486	3.78
Mississippi	82	1,790,618	74	90	1,645,716	92	763	4.64
Missouri	114	3,404,055	11	10	218,397	6	99	4.53
North Carolina	100	2,559,123	26	26	609,241	24	150	2.46
Oklahoma	77	2,028,283	20	26	638,023	31	145	2.27
South Carolina	46	1,683,724	26	57	894,142	53	233	2.61
Tennessee	95	2,337,885	27	28	773,811	33	168	2.11
Texas	254	4,663,228	64	25	1,839,780	39	348	1.90
Virginia	100	2,309,187	6	6	74,355	3	13	1.75
Total [1]	1,582	42,868,063	520	33	12,662,256	30	4,003	3.16

[1] Added to Maxcy's table.

[2] The average annual number of deaths occurring in those counties (in each state) which have an average rate of more than 1 per 10,000 (column (e)) and the total population of these counties according to the 1920 census (column (c)) are the figures on which the death rates (column (f)) are computed.

TABLE II

MALARIA DEATHS PER 100,000 POPULATION FOR TEN SOUTHEASTERN COUNTIES [1] IN VIRGINIA AND FOR THE STATE AS A WHOLE [2]

Year	State as a whole			Ten southeastern counties [3]		
	Population	Deaths	Rate	Population	Deaths	Rate
1918	2,259,672	81	3.7			
1919	2,284,429	69	3.0			
1920	2,309,187	51	2.2			
1921	2,320,215	43	1.9	237,127	12	5.1
1922	2,331,243	41	1.8	236,835	22	9.3
1923	2,342,271	45	1.9	236,541	18	7.6
1924	2,353,299	35	1.5	236,249	13	5.5
1925	2,364,327	45	1.9	235,955	14	5.9
1926	2,375,355	25	1.1	235,663	8	3.4
1927	2,386,383	23	1.0	235,369	4	1.7
1928	2,397,411	13	0.5	235,077	2	0.9
1929	2,408,439	16	0.7	234,783	6	2.5

[1] Number of deaths submitted by Dr. Grant, Director of Malaria Control, Virginia State Department of Health.
[2] Number of deaths submitted by the State Department of Health.
[3] The counties are as follows: Accomac, Brunswick, Greensville, Henrico, Isle of Wight, Nansemond, Norfolk, Northampton, Princess Anne, and Southampton.

6 counties (6 per cent) and an area embracing only 74,355 inhabitants, or 3 per cent of the total population. The average number of malaria deaths annually he gave as 13. The mortality figures for the state since 1910 and for 10 southeastern counties since 1921 are given in Tables II and III and are graphically presented in Figures II and III. It will be noted that up to 1928 the mortality curve was downward, but that it went up sharply in 1929. It is singular that the low point occurred 2 years later than the low for the 9 southern states combined (Figure I).

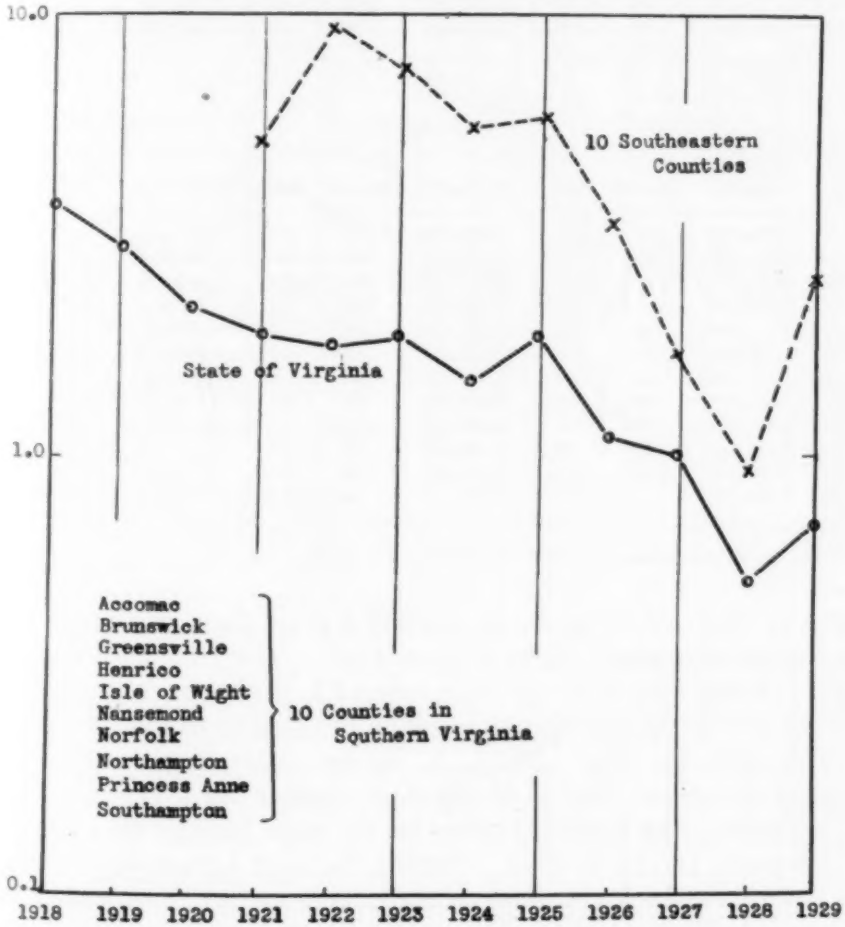
North Carolina—The character of the malaria problem in North Carolina is suggested by Table IV and Figure IV. All 26 of the counties (26 per cent) classed as malarious are located in the eastern part of the state in the tidewater belt. About 24 per cent of the population of the state live in these counties. The graphs for the central or Piedmont area and that for the western or mountain area indicate that, except for the eastern section, malaria is not a serious public health problem. By reference to Figure III and the supporting Table III the extent of the disease in this state may be compared with that found in 5 other states. The position as to the mortality curve is intermediate between Virginia and South Carolina. This is true also as to the extent of the area involved and as to the rate of mortality in the groups of counties where the disease is important. For the state the mor-

tality curve dropped steadily from 1918 to 1927. In 1928 and 1929 the rise was perceptible but very slight. The low point occurred a year earlier than in Virginia and 2 years later than in South Carolina.

South Carolina—The mortality record for malaria in South Carolina is interesting. It will be noted from Table I-A that 26 eastern counties (57 per cent), embracing a population of 894,142, or 53 per cent, had an average of 233 malaria deaths yearly during the 1919–1921 period. The area involves approximately the eastern three-fifths of the state for the period mentioned. Figure III and Table III show that the mortality rose through 1922, then dropped sharply for 3

FIGURE II

MALARIA DEATHS PER 100,000 POPULATION FOR TEN SOUTHEASTERN COUNTIES[1] IN VIRGINIA AND FOR THE STATE AS A WHOLE[2]



[1] Number of deaths submitted by Dr. Grant, Director of Malaria Control, Virginia State Department of Health.

[2] Number of deaths submitted by the State Department of Health.

TABLE III

MALARIA DEATHS PER 100,000 POPULATION FOR SIX SOUTHERN STATES,[1] 1918–1929

Year	Kentucky			Tennessee			Mississippi		
	Population	Deaths	Rate	Population	Deaths	Rate	Population	Deaths	Rate
1918	2,391,285	109	4.7	2,307,269	312	14.0	1,791,914	791	44.1
1919	2,403,957	73	3.0	2,322,579	256	10.3	1,791,264	653	36.5
1920	2,416,630	60	2.5	2,337,885	183	7.8	1,790,618	722	38.2
1921	2,437,334	84	3.4	2,364,972	360	15.2	1,812,354	963	53.1
1922	2,458,038	62	2.5	2,392,059	290	12.1	1,834,090	720	39.3
1923	2,478,742	46	1.9	2,419,416	215	8.9	1,855,826	581	31.3
1924	2,499,446	36	1.4	2,446,233	171	7.0	1,877,562	365	19.4
1925	2,520,150	43	1.7	2,473,320	155	6.3	1,899,298	411	21.6
1926	2,540,854	57	2.2	2,500,407	156	6.2	1,921,034	409	21.3
1927	2,561,558	55	2.1	2,527,494	156	6.2	1,942,770	487	25.1
1928	2,582,262	56	2.2	2,554,581	213	8.3	1,964,506	553	28.1
1929	2,602,966	43	1.7	2,581,668	179	6.9	1,986,242	316	15.9

Year	Virginia			North Carolina			South Carolina		
	Population	Deaths	Rate	Population	Deaths	Rate	Population	Deaths	Rate
1918	2,259,672	81	3.7	2,488,555	189	7.6	1,650,060	526	31.9
1919	2,284,429	69	3.0	2,523,838	201	7.9	1,666,892	531	31.9
1920	2,309,187	51	2.2	2,559,123	210	8.1	1,683,724	487	28.8
1921	2,320,215	43	1.9	2,620,239	180	6.9	1,688,608	477	28.2
1922	2,331,243	41	1.8	2,681,355	185	6.8	1,693,492	503	29.7
1923	2,342,271	45	1.9	2,742,471	169	6.2	1,698,376	269	15.8
1924	2,353,299	35	1.5	2,803,587	145	5.2	1,703,260	272	16.0
1925	2,364,327	45	1.9	2,864,703	141	4.9	1,708,144	183	10.7
1926	2,375,355	25	1.1	2,925,819	102	3.5	1,713,028	220	12.8
1927	2,386,383	23	1.0	2,986,935	60	2.0	1,717,912	282	16.4
1928	2,397,411	13	0.5	3,048,051	64	2.1	1,722,796	382	22.2
1929	2,408,439	16	0.7	3,109,167	66	2.1	1,727,680	372	21.5

[1] Number of deaths submitted by the State Departments of Health.

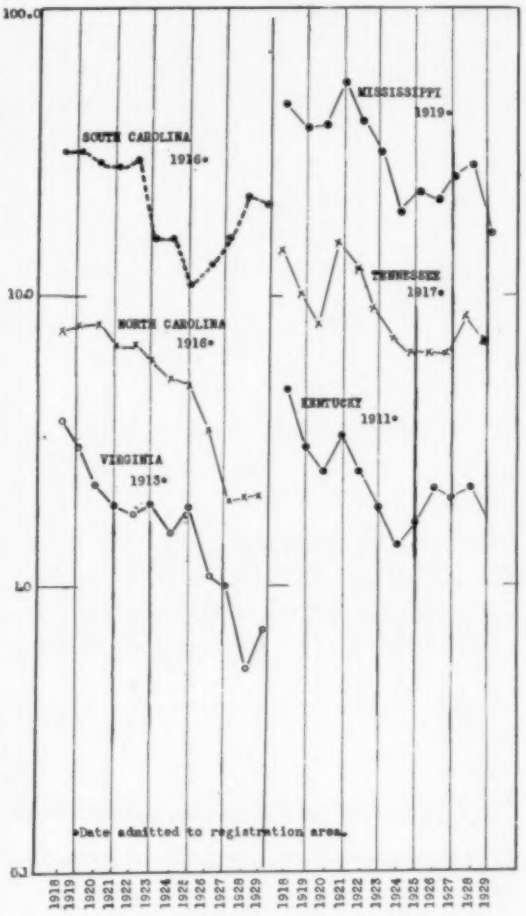
years to 1925. During the succeeding 3 years there was a sharp and continuous rise, and a slight drop in 1929. The 1922 rate was 29.7, the 1925 rate 10.7, and the 1928 rate 22.2, a rise much greater than occurred in North Carolina or Virginia, but similar to that observed in Florida and Alabama. Dr. J. A. Hayne, State Health Officer, expressed the opinion that 1930 will show another rise.

Georgia—The mortality curve for the state (Figure IV-A) reached a high point (20.2) in 1922. During the next 3 years it dropped to 9.8 in 1925, where it remained to 1927; 1928 and 1929 showed marked increases. The curve of the rainfall throughout this period corresponds very closely with the mortality curve, the only discrepancy

being that the former was higher than the latter for 1926 (Figure IV-A). The mortality record for 1928 in 69 counties is compared in Table V-A with the mortality of these counties as reported by Maxcy for 1921. The 1928 list shows 22 counties which in the 1921 record were not included in the malarious class. The comparison of the mortality rate by counties in this table is interesting in that it shows by counties the fluctuation in the mortality rates. This, of course, is to be expected where small population groups are considered. According to Dr. T. F. Abercrombie, the State Health Officer, available data suggest that the mortality rate for 1930 for the state will be somewhat lower than for the previous year.

FIGURE III

MALARIA DEATHS PER 100,000 POPULATION FOR SIX SOUTHERN STATES,[1] 1918–1929



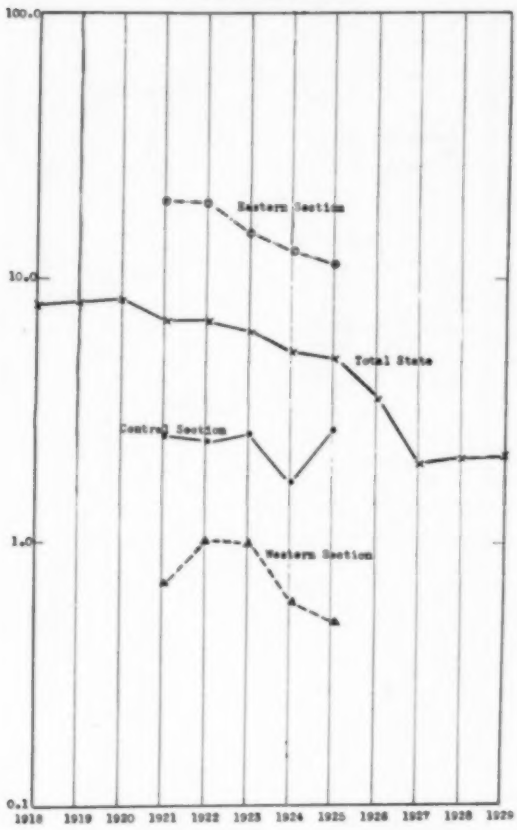
[1] Number of deaths submitted by the State Departments of Health.

Florida—The malaria problem in Florida is extensive, severe, and difficult. Three-fourths of the counties, embracing 80 per cent of the population, are malarious. From a rate of 43.6 in 1919 for the state, there was a fluctuating reduction to 16.1 in 1927, with a sharp trend upward in 1928 and 1929 to 33.2 (Table V and Figure V). Table V-A compares the malaria rates for 41 counties incriminated by Maxcy for the 1919–1921 period with the 1927–1929 period and shows high rates for both periods, although in 25 of the counties the rates were lower in the later period.

Alabama—The malaria mortality record in Alabama is reflected in Table V and Figure V. In 1918 the state mortality rate was 16.3 and in 1929, 16.4. The curve from 1918 was generally downward

FIGURE IV

MALARIA DEATHS PER 100,000 POPULATION FOR THREE SECTIONS OF NORTH CAROLINA AND FOR THE STATE AS A WHOLE [1]



[1] Figures submitted by State Department of Health, North Carolina.

until 1927 when the rate was 8.0. Of the 67 counties in the state, 29, or 43 per cent, including 37 per cent of the state population, were classed as malarious (Table I-A). Nineteen twenty-eight and 1929 were years of heavy precipitation and floods. Of the 29 counties which in 1919–1921 had over 10 deaths per 100,000 population, 18 continued to exceed this rate in the 1926-1928 period, and 7 other counties had increases which placed them in the malarious group, making a total of 25. The mortality curve for Florida for the past 8 years corresponds closely with those of South Carolina and Alabama and in all there were sharp rises in 1927 and 1928 with years of heavy rainfall in spring and summer.

Mississippi—Mississippi has had, and through 1928 continued to have, a serious malaria problem. In the 1919–1921 period (Table I-A) 90 per cent of the counties and 92 per cent of the population were in areas showing 10 or more deaths per 100,000 inhabitants. Figure III shows the state mortality curve and also compares the extent of its problem with that of 5 other states, 3 of them in the Mississippi River basin. In comparison with the curves shown for Tennessee and Kentucky, the Mississippi curve is high. Dr. Mark F. Boyd and his associates in the Mississippi State Board of Health have subdivided the 82 counties of the state into 5 groups and shown the malaria mortality rates and trends for each during the period 1914–1928 both for white and colored population (Tables VI and VII, and Figures VI and VII). For the state as a whole, 1921 was the record year for deaths, when the

TABLE IV

MALARIA DEATHS PER 100,000 POPULATION FOR THREE SECTIONS OF NORTH CAROLINA AND FOR THE STATE AS A WHOLE [1]

Year	State as a whole			Eastern Section		Central Section		Western Section	
	Population	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate
1918	2,488,555	189	7.6						
1919	2,523,838	201	7.9						
1920	2,559,123	210	8.1						
1921	2,620,239	180	6.9	137	18.5	29	2.5	6	0.7
1922	2,681,355	183	6.8	141	18.8	28	2.4	8	1.0
1923	2,742,471	169	6.2	112	14.7	31	2.6	8	1.0
1924	2,803,587	145	5.2	97	12.6	21	1.7	5	0.6
1925	2,864,703	141	4.9	86	11.1	33	2.7	4	0.5
1926	2,925,819	102	3.5						
1927	2,986,935	60	2.0						
1928	3,048,051	64	2.1						
1929	3,109,167	66	2.1						

[1] Figures submitted by State Department of Health, North Carolina.

rate was 53.1. The mortality curve then fell sharply to 19.4 in 1924. Thereupon it rose steadily for 4 years till it reached 28.1 in 1928. In 1929 there was a sharp drop which Dr. Boyd thinks has become even sharper in 1930, owing to the exceptional drought.

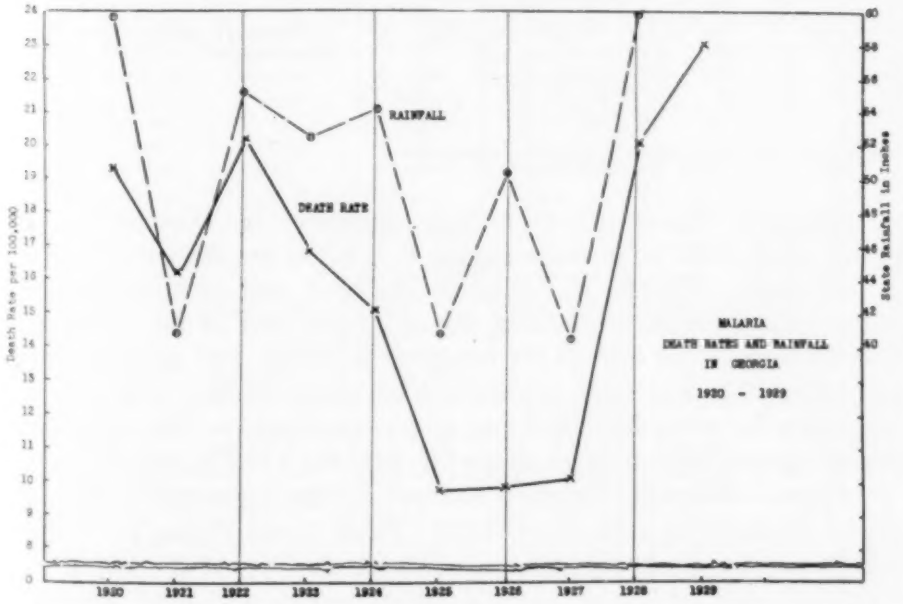


FIGURE IV-A

Tennessee—Malaria in Tennessee is found mainly in the western counties. The graph Figure III shows the trends in the death rates for the state as a whole for the period 1918–1929. The year 1921 was the high point in the mortality curve, when the rate was 15.2; and from the low point of 6.3, reached in 1925, there has been no increase to more than 7.0, except in 1928 when it was 8.3.

Kentucky—Kentucky, like Illinois and Tennessee, has only a small part of its area, 5 per cent of the counties and 5 per cent of the population, in the malaria zone. The general trend since 1918 (Figure III and Table III) has progressed downward from a rate of 4.7 to 1.4. The low point was reached in 1924. Except for the 3-year period 1926–1928, when it rose to 2.2, the rate has remained under 2.0.

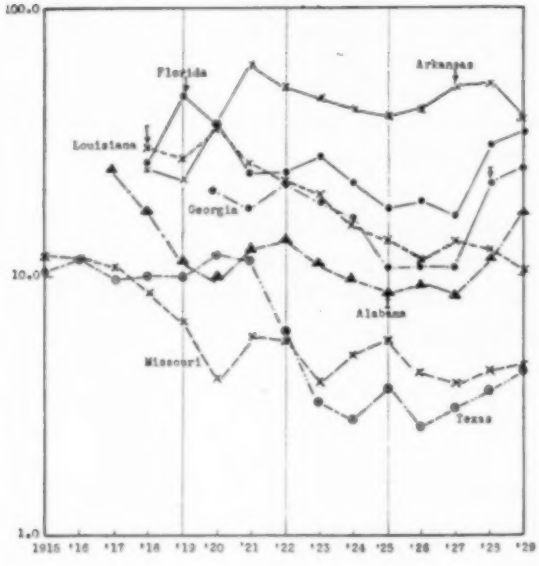


FIGURE V

MALARIA DEATHS PER 100,000 POPULATION FOR SEVEN SOUTHERN STATES

NOTE—Arrow indicates year state was admitted to registration area, with the exception of Missouri, which was admitted 1911. Texas has not yet been admitted.

[1] Number of deaths submitted by the State Departments of Health.

Missouri—The trend of malaria mortality in Missouri for the period 1918–1929 is shown in Figure V. It has not fluctuated widely.

Arkansas—Malaria in Arkansas has been and continues to be a major health problem involving about 69 per cent of the counties in which about 75 per cent of the inhabitants reside. As in other states, the years 1921 and 1928 represent high points in the curve (Figure V), when the rates were 58.3 and 47.8 respectively. The intervening period showed only a slight drop, but that for 1929 is sharper.

Texas—Although Texas is not yet in the registration area, the record of deaths by years is available (Table V and Figure V). There will be noted a relatively high mortality for the 1915–1921 period, then a notable drop for 5 years to 1926, when the rate was 2.6. Since that time the rate has risen gradually but steadily through 1929 to 4.2. In

TABLE V

MALARIA DEATHS PER 100,000 POPULATION FOR SEVEN SOUTHERN STATES[1]

Year	Arkansas			Year	Texas		
	Population	Deaths	Rate		Population	Deaths	Rate
				1915	4,279,887	426	10.0
				1916	4,356,556	484	11.1
				1917	4,433,225	413	9.3
1918	1,716,653	404	23.5	1918	4,509,894	428	9.5
1919	1,734,428	367	21.2	1919	4,586,563	436	9.5
1920	1,752,204	610	34.8	1920	4,663,228	528	11.3
1921	1,762,382	1,027	58.3	1921	4,779,032	523	10.9
1922	1,772,560	824	46.5	1922	4,894,836	290	5.9
1923	1,782,738	756	42.4	1923	5,010,640	160	3.2
1924	1,792,916	700	39.0	1924	5,126,444	141	2.8
1925	1,803,094	646	35.8	1925	5,242,248	192	3.7
1926	1,813,272	695	38.3	1926	5,358,052	139	2.6
1927	1,823,450	844	46.3	1927	5,473,856	170	3.1
1928	1,833,628	876	47.8	1928	5,589,660	204	3.6
1929	1,843,806	667	36.2	1929	5,705,464	238	4.2

Year	Missouri			Alabama		
	Population	Deaths	Rate	Population	Deaths	Rate
1915	3,348,695	388	11.6			
1916	3,359,767	374	11.1			
1917	3,370,839	356	10.6	2,285,149	530	23.2
1918	3,381,911	278	8.2	2,306,157	376	16.3
1919	3,392,983	218	6.4	2,327,165	257	11.0
1920	3,404,055	137	4.0	2,348,174	221	9.4
1921	3,425,746	192	5.6	2,377,886	259	10.9
1922	3,447,437	186	5.4	2,407,598	314	13.0
1923	3,469,128	132	3.8	2,437,310	257	10.5
1924	3,490,819	169	4.8	2,467,022	229	9.3
1925	3,512,510	189	5.4	2,496,734	204	8.2
1926	3,534,201	145	4.1	2,526,446	221	8.7
1927	3,555,892	136	3.8	2,556,158	204	8.0
1928	3,577,583	151	4.2	2,585,870	291	11.3
1929	3,599,274	153	4.3	2,615,582	428	16.4

Year	Florida			Louisiana			Georgia		
	Population	Deaths	Rate	Population	Deaths	Rate	Population	Deaths	Rate
1918	925,299	224	24.2	1,770,084	510	28.8			
1919	946,884	440	43.6	1,784,296	471	26.4			
1920	968,470	352	35.1	1,798,509	613	34.1	2,895,832	559	19.3
1921	1,018,285	231	22.7	1,828,108	463	25.3	2,896,493	468	16.2
1922	1,068,101	247	23.1	1,857,707	401	21.6	2,897,154	584	20.2
1923	1,117,916	293	26.2	1,887,306	318	16.8	2,897,815	489	16.9
1924	1,167,732	249	21.3	1,916,905	282	14.7	2,898,476	440	15.2
1925	1,217,547	209	17.2	1,946,504	252	12.9	2,899,137	285	9.8
1926	1,267,363	230	18.1	1,976,103	211	10.7	2,899,798	288	9.9
1927	1,317,178	212	16.1	2,005,702	269	13.4	2,900,459	296	10.2
1928	1,366,994	401	29.3	2,035,301	251	12.3	2,901,120	582	20.1
1929	1,416,809	470	33.2	2,064,900	206	10.0	2,901,781	667	23.0

[1] Number of deaths submitted by the State Departments of Health.

TABLE V-A

COMPARISON OF MALARIA DEATHS PER 100,000 POPULATION FOR COUNTIES IN FLORIDA, ALABAMA AND GEORGIA FOR PERIODS INDICATED

Florida

Counties	1919–1921 [1] rate	1927–1929 [2] rate	+ indicates increase in 1927–1929 rate
Alachua	41.0	26.9	− 14.1
Baker	35.0	16.2	− 18.8
Bay	52.0	25.1	− 26.9
Bradford	24.0	10.0	− 14.0
Calhoun	57.0	79.0	+ 22.0
Citrus	153.0	91.7	− 61.3
Columbia	35.0	41.2	+ 6.2
De Soto	20.0	8.9	− 11.1
Duval	12.0	6.1	− 5.9
Escambia	12.0	13.3	+ 1.3
Franklin	20.0	32.9	+ 12.9
Gadsden	47.0	94.6	+ 47.6
Hamilton	50.0	52.4	+ 2.4
Hernando	44.0	41.1	− 2.9
Hillsborough	16.0	5.7	− 10.3
Holmes	47.0	54.4	+ 7.4
Jackson	106.0	94.5	− 11.5
Jefferson	145.0	124.8	− 20.2
Lafayette	176.0	41.9	− 134.1
Lake	39.0	19.0	− 20.0
Leon	111.0	31.2	− 79.8
Levy	150.0	134.3	− 15.7
Liberty	40.0	47.0	+ 7.0
Madison	100.0	151.9	+ 51.9
Manatee	26.0	13.8	− 12.2
Marion	63.0	63.3	+ 0.3
Nassau	26.0	10.2	− 15.8
Okaloosa	21.0	10.3	− 10.7
Okeechobee	94.0	53.9	− 40.1
Orange	25.0	6.9	− 18.1
Palm Beach	16.0	2.2	− 13.8
Polk	23.0	7.6	− 15.4
Putnam	20.0	11.7	− 8.3
St. Lucie	13.0	13.9	+ 0.9
Santa Rosa	15.0	14.3	− 0.7
Sumter	64.0	79.4	+ 15.4
Suwanee	86.0	102.6	+ 16.6
Taylor	178.0	125.4	− 52.6
Wakulla	40.0	111.1	+ 71.1
Walton	17.0	25.4	+ 8.4
Washington	25.0	66.1	+ 41.1
Broward		11.9	
Charlotte		[5] 24.9	
Clay		60.5	
Dixie		[5] 202.5	
Flagler		40.6	
Gilchrist		[5] 120.8	
Gulf		[5] 31.4	
Indian River		[5] 14.9	
Osceola		10.0	
Pasco		29.3	
Sarasota		[5] 16.1	
Seminole		34.9	
Union		[5] 54.1	
Volusia		12.9	

Alabama

Counties	1919–1921 [1] rate	1926–1928 [3] rate	+ indicates increase in 1926–1928 rate
Autauga	11.0	9.0	− 2.0
Baldwin	15.0	16.3	+ 1.3
Barbour	22.0	10.3	− 11.7
Bibb	13.0	9.8	− 3.2
Bullock	16.0	6.7	− 9.3
Choctaw	19.0	16.4	− 2.6
Clarke	11.0	39.0	+ 28.0
Colbert	16.0	16.7	+ 0.7
Crenshaw	13.0	8.7	− 4.3
Dale	13.0	4.2	− 8.8
Dallas	18.0	12.0	− 6.0
Geneva	31.0	32.5	+ 1.5
Greene	28.0	31.4	+ 3.4
Hale	33.0	19.4	− 13.6
Henry	19.0	9.1	− 9.9
Houston	40.0	43.1	+ 3.1
Lamar	11.0	5.3	− 5.7
Lawrence	16.0	12.6	− 3.4
Lowndes	16.0	14.6	− 1.4
Macon	13.0	19.0	+ 6.0
Marengo	17.0	30.5	+ 13.5
Monroe	14.0	9.9	− 4.1
Montgomery	12.0	21.0	+ 9.0
Morgan	17.0	8.9	− 8.1
Perry	16.0	10.6	− 5.4
Pickens	24.0	27.3	+ 3.3
Talladega	17.0	9.2	− 7.8
Walker	12.0	6.5	− 5.5
Washington	14.0	28.0	+ 14.0
Butler		12.4	
Conecuh		10.0	
Covington		11.0	
Madison		17.8	
Shelby		17.3	
Tuscaloosa		14.2	
Wilcox		21.6	

[1] Figures taken from Maxcy's article U. S. P. H. S. *Reprint, No. 839*, May 25, 1923.

[2] The last 14 counties listed had a rate of 10 or more deaths per 100,000 population in 1927–1929. Number of deaths submitted by the Florida State Department of Health.

[3] The last 7 counties listed show a rate of 10 deaths per 100,000 or higher in 1926–1928. Figures submitted by Alabama State Department of Health.

Georgia

Counties	1921 [1] rate	1928 [4] rate	+ indicates increase in 1928 rate
Appling	28.0	0.0	− 28.0
Bacon	15.0	14.4	− 0.6
Baker	48.0	12.6	− 35.4
Bartow	13.0	0.0	− 13.0
Ben Hill	14.0	7.5	− 6.5
Berrien	19.0	0.0	− 19.0
Bibb	13.0	6.6	− 6.4
Bleckley	67.0	116.9	+ 49.9
Brooks	53.0	18.2	− 34.8
Bryan	48.0	0.0	− 48.0
Burke	71.0	148.9	+ 77.9
Calhoun	49.0	66.6	+ 17.6
Camden	57.0	61.9	+ 4.9
Candler	11.0	11.1	+ 0.1
Charlton	45.0	0.0	− 45.0
Chatham	20.0	7.7	− 12.3
Clay	26.0	84.9	+ 58.9
Colquitt	31.0	3.3	− 27.7
Crisp	21.0	62.3	+ 41.3
Dawson	24.0	0.0	− 24.0
Decatur	19.0	27.7	+ 8.7
Dooly	20.0	32.4	+ 12.4
Early	105.0	70.6	− 34.4
Effingham	60.0	0.0	− 60.0
Emanuel	35.0	4.1	− 30.9
Floyd	18.0	2.1	− 15.9
Glascock	71.0	0.0	− 71.0
Glynn	15.0	5.2	− 9.8
Grady	15.0	30.9	+ 15.9
Hancock	16.0	0.0	− 16.0
Haralson	14.0	0.0	− 14.0
Houston	18.0	44.7	+ 26.7
Irwin	16.0	32.5	+ 16.5
Jefferson	31.0	85.3	+ 54.3
Jenkins	70.0	136.5	+ 66.5
Johnson	45.0	54.4	+ 9.4
Jones	15.0	10.2	− 4.8
Laurens	48.0	29.4	− 18.6
Lee	37.0	101.8	+ 64.8
Lowndes	45.0	23.9	− 21.1
McIntosh	80.0	17.8	− 62.2
Macon	51.0	41.4	− 9.6
Mitchell	27.0	62.5	+ 35.5
Monroe	15.0	7.5	− 7.5
Muscogee	14.0	7.3	− 6.7
Oglethorpe	20.0	6.9	− 13.1
Pierce	25.0	40.3	+ 15.3
Polk	15.0	0.0	− 15.0
Pulaski	35.0	73.5	+ 38.5
Rockdale	11.0	13.0	+ 2.0
Randolph	30.0	11.7	− 18.3
Richmond	19.0	0.0	− 19.0
Schley	19.0	0.0	− 19.0
Screven	42.0	84.6	+ 42.6
Sumter	54.0	32.9	− 21.1
Taliaferro	11.0	0.0	− 11.0
Tattnall	28.0	13.1	− 14.9
Telfair	13.0	73.0	+ 60.0
Terrell	31.0	43.1	+ 12.1
Thomas	30.0	45.9	+ 15.9
Toombs	22.0	6.1	− 15.9
Treutlen	39.0	0.0	− 39.0
Turner	16.0	26.2	+ 10.2
Twiggs	19.0	22.8	+ 3.8
Washington	28.0	46.8	+ 18.8
Wayne	22.0	30.8	+ 8.8
Wheeler	41.0	0.0	− 41.0
Wilcox	26.0	72.2	+ 46.2
Worth	33.0	60.1	+ 27.1
Brantley		29.0	
Bullock		11.3	
Clinch		13.9	
Cook		26.6	
Dodge		41.3	
Dougherty		73.3	
Evans		14.3	
Fulton		27.1	
Jeff Davis		12.6	
Lanier		57.8	
Liberty		116.7	
McDuffie		10.5	
Miller		54.5	
Montgomery		10.2	
Murray		11.4	
Newton		11.0	
Seminole		27.0	
Spalding		13.0	
Stewart		35.4	
Tift		27.1	
Ware		18.6	
Warren		17.7	

[4] The last 22 counties listed show a rate of 10 deaths per 100,000 or higher in 1929. Number of deaths submitted by Georgia State Department of Health.

[5] Not listed as a county in 1920.

TABLE VI

MALARIA DEATHS PER 100,000 POPULATION FOR FIVE GROUPS OF COUNTIES IN MISSISSIPPI,[1] 1914–1928

Year	White Death Rates				
	Delta	Bluff	North Eastern	South Central	Coastal
1914	163.0	65.2	31.3	18.4	13.9
1915	216.0	105.2	53.2	33.7	22.7
1916	153.0	89.5	49.8	52.4	29.3
1917	132.2	62.6	28.2	34.7	11.1
1918	75.8	21.6	24.4	16.9	8.7
1919	83.0	38.1	17.6	16.9	8.6
1920	93.0	40.2	15.5	14.1	2.1
1921	125.5	58.6	31.5	18.6	10.5
1922	124.2	32.8	23.1	10.9	10.3
1923	71.0	25.6	19.7	11.9	51.2
1924	36.3	15.4	11.8	4.1	30.4
1925	48.4	14.4	9.9	5.5	0.0
1926	51.6	19.5	11.6	6.5	1.9
1927	51.2	19.5	12.3	6.5	1.9
1928	73.0	27.6	13.9	7.9	1.9

[1] Figures submitted by Dr. Boyd, Bureau of Malaria Control, Mississippi State Board of Health.

TABLE VII

MALARIA DEATHS PER 100,000 POPULATION IN FIVE GROUPS OF COUNTIES IN MISSISSIPPI,[1] 1914–1928

Year	Negro Death Rates				
	Delta	Bluff	North Eastern	South Central	Coastal
1914	134.4	79.8	39.2	36.9	27.2
1915	157.2	122.4	69.9	47.1	67.1
1916	139.5	107.5	67.2	68.6	22.9
1917	113.2	66.7	40.0	50.8	47.4
1918	112.7	60.5	34.1	32.1	60.5
1919	84.2	49.6	22.4	28.2	12.6
1920	107.0	61.6	22.1	21.8	19.5
1921	110.5	86.1	42.3	27.7	30.1
1922	84.5	66.8	29.0	16.9	13.9
1923	78.2	45.7	22.2	12.5	14.4
1924	42.4	36.4	21.8	10.9	7.5
1925	58.0	32.0	18.9	15.7	6.9
1926	44.7	43.7	20.6	12.9	0.0
1927	54.0	40.0	15.2	15.5	0.0
1928	55.4	50.8	21.5	18.1	17.7

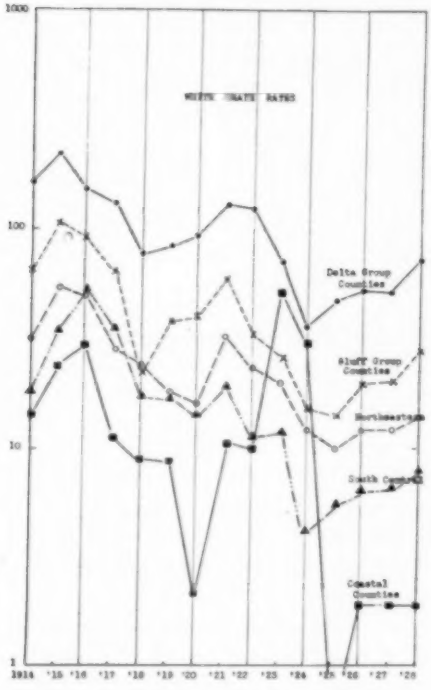
[1] Figures submitted by Dr. Boyd, Bureau of Malaria Control, Mississippi State Board of Health.

comparing the relative position of the various state mortality curves, we should again recall that certain groups of counties in a large state may present intensely malarious conditions while for obvious reasons the rate for the state as a whole will be low.

FIGURE VI

MALARIA DEATHS PER 100,000 POPULATION FOR FIVE GROUPS OF COUNTIES IN MISSISSIPPI,[1] 1914–1928

White

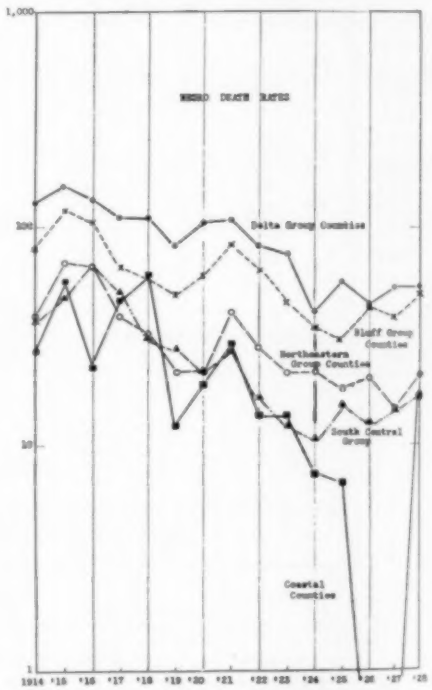


[1] Figures submitted by Dr. Boyd, Bureau of Malaria Control, Mississippi State Board of Health.

FIGURE VII

MALARIA DEATHS PER 100,000 POPULATION FOR FIVE GROUPS OF COUNTIES IN MISSISSIPPI,[1] 1914–1928

Negro



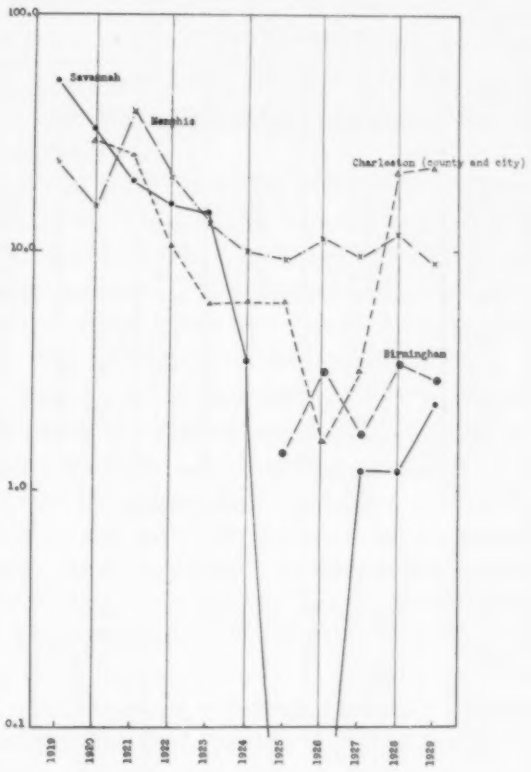
[1] Figures submitted by Dr. Boyd, Bureau of Malaria Control, Mississippi State Board of Health.

URBAN MALARIA—CHARLESTON, BIRMINGHAM, SAVANNAH, MEMPHIS

Malaria has been regarded in this country as essentially a rural disease. The studies of the past 10 or 15 years support this view. For the cities it is not easy to be sure how much of the malaria is contracted outside the city, but it is believed that in recent years the transmission within the cities, certainly within those having creditable health services, has been relatively slight. Dr. C. C. Bass supplied a record of the malaria cases in the New Orleans Charity Hospital for the period 1925 through October, 1930. There were 574 cases of which 287, or 50.0 per cent, were not residents of the city, and 30, or 5.2 per cent, not residents of Louisiana. According to Dr. Bass, deaths from malaria

FIGURE VIII

MALARIA DEATHS PER 100,000 POPULATION FOR FOUR SOUTHERN CITIES



are so rare in New Orleans that no definite opinion can be formed as to mortality. Only 4 deaths occurred in the total of 574 cases mentioned. In cities, the study of the age distribution of deaths and cases is important. Adults may contract the disease elsewhere, but in the case of children this is less likely. Table VIII and Figure VIII give the mortality curves for Charleston, Savannah, Birmingham, and Memphis. The record for Charleston includes the population of Charleston County as well as of the city, and it is presumed that deaths of nonresidents are included. The figures for Savannah since 1923 are for city residents only. Those for Memphis presumably include all malaria deaths occurring in the city. As from one-fourth to one-half of the patients in a number of city hospitals are not residents of the city, the complete record of deaths may not correctly reflect conditions in the city.

CONCLUDING COMMENTS

During the 5-year period prior to 1920, there was general interest in malaria and in measures for its control. Studies designed to evaluate the various methods of control were undertaken by the U. S. Public Health Service and the state health departments, with the coöperation of the International Health Division of the Rockefeller Foundation. Drugs, screening, and drainage were tested under varying conditions. During the mobilization of troops for the Great War, a vast amount of control work about the cantonment areas, mainly by drainage, was carried on. Coöperative experimental drainage undertaken by the health authorities in the towns was so successful over a 3-year period

TABLE VIII

MALARIA DEATHS PER 100,000 POPULATION FOR FOUR SOUTHERN CITIES

Year	Savannah, Georgia [1]			Memphis, Tennessee [3]					
	Population	Deaths [2]	Rate	Number of deaths			Rates		
				White	Colored	Total	White	Colored	Total
1919	81,433	41	50.3	10	24	34	10.5	44.0	22.7
1920	83,252	27	32.4	7	18	25	6.9	29.3	15.3
1921	83,698	16	19.1	22	41	63	21.2	66.4	38.0
1922	84,144	13	15.4	16	18	34	15.1	29.1	20.1
1923	84,590	12	14.2	11	11	22	10.2	17.7	12.9
1924	85,036	3	3.5	8	9	17	7.3	14.3	9.9
1925	85,482	0	0.0	11	5	16	9.9	8.0	9.2
1926	85,928	0	0.0	13	7	20	11.4	11.1	11.3
1927	86,374	1	1.2	9	8	17	7.8	12.6	9.5
1928	86,820	1	1.2	13	9	22	10.3	14.1	11.6
1929	87,266	2	2.3	8	9	17	6.2	14.0	8.8

Year	Charleston, South Carolina [4]			Birmingham, Alabama [5]		
	Population	Deaths	Rate	Population	Deaths	Rate
1920	67,957	19	28.0			
1921	67,374	17	25.2			
1922	66,791	7	10.5			
1923	66,208	4	6.0			
1924	65,625	4	6.1			
1925	65,042	4	6.1	218,231	3	1.4
1926	64,459	1	1.6	226,116	7	3.1
1927	63,876	2	3.1	234,001	4	1.7
1928	63,293	13	20.5	241,886	8	3.3
1929	62,710	14	22.3	249,771	7	2 8

[1] Deaths submitted by Dr. Bassett, Health Officer.
[2] Non-residents not included.
[3] Figures submitted by Mr. LePrince, U. S. P. H. S.
[4] Number of deaths submitted by Dr. Banov, City Health Officer, includes deaths from Charleston County as well as the city.
[5] Number of deaths submitted by Dr. Dowling, County Health Officer of Jefferson County, Ala.

that in the last half of 1919 a program of coöperation between the U. S. Public Health Service and the state health departments—with the International Health Division of the Rockefeller Foundation participating—for extending the work to other malarious towns was instituted. This program was continued actively for 4 years during which 114 towns of 11 states were surveyed and anti-larval measures based mainly upon minor drainage were carried out.

In 1922 the extra-state agencies transferred their aid to programs involving state and county coöperation in measures for the control of

malaria in rural areas to county health organizations. As malaria had to take its place along with other health problems claiming the attention of the inadequately staffed organizations, and as the problem in rural areas is vast and far more difficult than in the circumscribed areas of the towns, the results have not been in the least spectacular. The declines in the death rates which occurred from 1922 to 1926 may have given a false sense of security and have tended to place unwarranted value on the antimalaria activities.

After a period of coöperation in both town and rural control measures, the outside agencies gradually reduced or withdrew their aid. To what extent the state and counties have increased or decreased their antimalaria activities, I cannot say. It is certain that with the marked rise in the incidence and death rates in 1927 and 1928, concern among the health officials was quite general and pronounced.

Field studies of malaria have been carried on more or less continuously in the South since 1915 by the official organizations aided by the coöperating voluntary health agencies. Knowledge as to the characteristics and habits of the 3 species of anopheles has been enlarged; the relative value of spleen, blood, and histories as bases for diagnoses and for indexes has been studied. Moreover, the conditions under which drainage, Paris green, screening, and the use of quinine or other drugs may be effective have been studied. To what extent the approach to malaria control has been influenced by the reports of these investigations is not known. It has been observed that the disease generally is more or less localized and that control measures must be aimed at the focuses of infection. In some localities, however, malaria is more or less widely and uniformly distributed. Certainly the enlarged knowledge should lead to more direct and more economical control measures.

The factors making for the general recession of malaria have not been convincingly evaluated. The extension of drainage and agriculture seems to have been related to the decline, but the influence of rainfall during the anopheles breeding season seems to be the most important single factor in the areas still classed as malarious.

The notable rise in the mortality curves for Florida and Alabama in 1929 to points higher than were recorded in the 1921–1922 peak (Figure V), and the somewhat more moderate rises in the other incriminated states make it clear that malaria is still a menace to the health and working efficiency of the people of the South, and that the measures directed against it were inadequate for holding the gains through wet years. Although the drought of 1930 may have again turned the general trend downward, this is not yet assured. Shall the

health forces let malaria have its way, or shall they influence its course and hasten its disappearance? The task offers a challenge.

We are still confronted with a disease about which we have had for years all knowledge regarded as essential, yet like another disease in this category—diphtheria—it is still with us. It thrives most in the type of community least able to combat it. Economic distress is associated with its rise either as a cause or as a result. When natural causes do not favor its recession, the health forces must redouble their activities and possess knowledge that will guide in the most direct and economical measures of control.

REFERENCE

1. Maxcy, Kenneth F. *Pub. Health Rep.*, May 25, 1923 (*Reprint No. 859*).

DISCUSSION

J. A. LEPRINCE

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DR. FERRELL'S paper should arouse a wider interest in following the future trend of malaria prevalence. It certainly looks as though a change that we do not understand has taken place in parts of some states during the past 3 years. It has even been noticed in Illinois and southern Indiana. In the latter state the change was not due to local rainfall.

It is most unfortunate that information is available only for limited areas when there are malaria problems in 520 counties. Dr. Ferrell brings out the point that we have more complete reporting then we had in former years, and that is encouraging. I believe that it is possible for a larger number of county health units to get case records which would indicate more closely where the county malaria problems are, and that such information would be of value to the state health departments. It will be of interest to compare the reported case rates with death rates in county areas, to see the relative value of the two trends, when plotted with such data as are available, where the reporting is fairly complete.

Attention is called to the fact that since 1926 a start has been made toward the rural problem of malaria control and that we very much need more complete reporting by practising physicians in order to measure the results of anti-malaria activities over a period of years. The representative of the International Health Board in Mississippi has accomplished an outstanding piece of work in the delta counties of Mississippi this year and if we can have similar interest aroused in the malaria ridden counties of other states, we can get enough people to become interested in our problems to keep the trend of malaria where we want it. It is well worth while for the directors of county health units to make a strong effort to enlist the aid of the county medical society, and county physicians, in the reporting of all their malaria cases. Where this is not done they have no definite idea of where their problems lie.

It is my belief that the downward trend of malaria will be in direct proportion to the effort put forth on having the farm tenant population thoroughly understand

the need of their taking part in this reduction. We all realize the importance of having the carriers sleep in screened homes, and some county health departments have already shown that in years of average prosperity both plantation owners and tenants can be induced to pay for such protection in districts where other anti-malaria measures cannot yet be carried on. Such procedure is applicable to many localities where malaria is more or less widely distributed, and intensive study is needed to determine the best methods along this line, which can be made to increase the downward trend of malaria prevalence.

In Alabama, in September, 1928, 2,000 cases of malaria were recorded by physicians, in August, 1929, 2,879, and as this is only a portion of the cases that occurred among the rural population it is evident that we cannot afford to assume that our malaria problem is not worthy of attention.

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OUR discussion of Dr. Ferrell's paper will relate only to conditions as they obtain in Texas. Exact statistics on the incidence of and deaths from malaria are not available. According to Dr. J. C. Anderson, State Health Officer, who practised years ago in central Texas, the bulk of his work 30 or even 20 years ago consisted in the treatment of malarial patients. A steady decline in the number of cases was noted up to about 10 years ago, which he believes was due to the efforts of physicians in educating the population as to the value of taking quinine, the screening of homes, and the destruction of mosquito breeding places as the country developed and farming conditions improved. Dr. Cumming, a prominent physician who has practised for many years at Hearne, in the malaria belt, concurs in Dr. Anderson's statements.

Surveys by Magoon and Hardenburg in 1919 and 1920 of a certain group of towns in east Texas showed 10 per cent to 35 per cent of the population affected with maalaria. Surveys by Dr. William Sory in 1921 and 1922 in Cherokee County show a rate varying from 2.8 per cent in a town to 38.8 per cent in a rural district.

Records of the Cotton Belt Railway show a decline in the number of cases noted among their employees at the beginning of their control work in 1917. The 1913–1916 average showed 602 hospital cases per year from about 6,600 employees and the 1928–1929 average showed 68 hospital cases per year among approximately 6,000. Malaria deaths reported to the State Department of Health over a 20-year period declined from 407 in 1910 to 238 in 1929, with the lowest figure at 139 in 1926. The malaria death curve graphically shows a steady decline up to the last 4 years. Records of cases are not available except for the past 4 years. For that period the total cases reported for the state were: 12,542 in 1926; 8,823 in 1927; 13,623 in 1928; and 15,697 in 1929. It is estimated, however, that only about 40 per cent of the cases are reported; hence, we have at least 50,000 cases annually in Texas. According to the estimates of 1928, the population of the 108 counties affected was 3,266,000. For the 4-year period named the rates in consecutive order are 380, 239, 417, and 480—or an increase of more than 100 cases per 100,000 in 1929 over 1926.

In order to study the relation of the rainfall of the section to the incidence of

malaria, data on the average precipitation for the 4-year period were compiled. Figures from the U. S. Weather Bureau showed an annual precipitation of about 49.7 inches in 1926; 43.7 in 1927; 38.7 in 1928; and 44.1 in 1929. The lowest figure is for 1928, whereas the lowest number of malaria cases was reported in 1927. From this very limited comparison, we would say that the variation in rainfall apparently had no effect upon the number of cases reported.

We made a further selection of a group of 11 counties which showed the highest incidence of malaria according to physicians' reports for the 4-year period and determined the case rates by the estimated population of 1928. See Table I for a tabulation of these figures.

TABLE I

County	Population	Rate per 100,000 (Av. for 4 yrs.)
Morris	10,298	3,175.0
Red River	35,829	1,102.0
Nacogdoches	28,457	1,049.0
Lamar	55,742	1,011.0
Kaufman	41,276	940.0
Fannin	48,186	940.0
Hunt	50,350	810.3
Collin	52,000	669.0
Cameron	65,000	444.6
Wichita	115,000	362.0 (For 1929 only)
Hidalgo	75,000	344.0

Wichita County is included in this group, although it is well beyond what is ordinarily termed the malaria belt of Texas. Irrigation was introduced in Wichita County on rather a large scale in 1926. In 1926, 3 cases of malaria were reported, 31 in 1927, 9 in 1928, and 417 in 1929—a rate of 362 per 100,000 population as indicated above. The high incidence in Hidalgo and Cameron counties may likewise be attributed to the effect of irrigation. Each year sees more land irrigated—and a greater incidence of malaria. Referring again to Cherokee County, in 1919 the town of Jacksonville reported over 800 cases of malaria, which after persistent control work declined to 7 in 1929. Other towns which have carried on control work year after year show a decline. A low level has been reached which never rises to that of 20 years ago. Intensive work is being carried on in about 40 towns at present, while possibly 100 or more do some work of an intermittent nature.

The State Department of Health is asking for an appropriation for malaria control work for the coming biennium. If granted, the money will be expended in employing county sanitarians or "mosquitoologists," and the establishment of county units in the malarial sections. An educational campaign put on recently by the department had the active support of the East Texas Chamber of Commerce. Through addresses made before a population of some 25,000 persons in the 40 towns visited, an attempt was made to arouse interest in the problem. The enormous economic losses were recounted and compared with the cost of control. It is hoped to continue educational work through the spring and summer, and, if possible, induce all counties affected to carry the work into the rural communities.

In the opinion of our epidemiologist and others conversant with conditions, malaria in Texas is now primarily a rural problem. It has reached as low a level as is possible without further intensive work which should be extended to the rural districts on a widespread basis.

FELIX J. UNDERWOOD, M. D.

State Health Commissioner, Jackson, Miss.

IN 7 months, January to July, 1930, there were reported 122 deaths ascribed to malaria as against 118 in same period of 1929. In each year there were reported 46 deaths in whites during the same period. Of the white deaths in 1929, the diagnosis in only 2 was reported as having been verified by microscopical examination, against 11 in 1930. In none of the 1929 negro deaths had the diagnosis been verified, while in 1930, 5 were. It would appear that some progress is being made in the more precise diagnosis of malaria.

For the period considered, the mortality reports do not indicate a significant difference in the incidence of malaria in 1929 and 1930. It is the present belief, however, based on diagnostic laboratory examinations, the results of field surveys, and data gathered from practising physicians, that in our delta territory the incidence of malaria in 1930 is lower than in 1929, and perhaps is the lowest on record. This is attributable to the severe drought.

The malaria control program in Mississippi is executed by and through the whole-time county health departments and is largely directed to the rural problem. It has been developed with a full appreciation of the meager resources and varied responsibilities of these organizations. It is realized that the accomplishments of any one year can only be modest in extent, and that satisfactory results require sustained, uniform efforts over an extended period. The supervision of the State Board of Health should guarantee the continuity of this program.

In brief the program is:

1. Education of physicians to be more precise in making a diagnosis of malaria, and requirement of the reporting of cases individually with particulars regarding place of residence. The health departments are required to keep spot maps of these cases.
2. Popular education, carried on largely through the movies, some of which is particularly designed to reach the negro.
3. The promotion of screening.
4. The promotion of minor drainage.

The first year's operation has demonstrated the workability of this program, while in several counties very satisfactory progress has been made.

OUTLOOK FOR 1931

We regard the situation in 1931 with concern. It is desirable to conserve to the greatest extent possible the natural gains of 1930, yet the current economic depression will probably make it difficult to accomplish as much.

Cost of Malaria Control*

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COST of malaria control includes medical treatment and preventive measures such as larval control of anopheles, screening of houses, use of mosquito bars over beds and destruction of anopheles in homes.

In towns and villages where larval control is being accomplished it is generally the desire of the public that the work be done in such a manner that not only shall there be a reduction of malaria but also a most decided reduction of pestiferous mosquitoes. In most instances as the campaign advances it obtains approval or disapproval according to the prevalence or absence of non-disease bearing mosquitoes, and this condition has often compelled the field workers to undertake the elimination of stegomyia, *Culex fatigans*, and other mosquitoes, as well as *Anopheles punctipennis*. We have communities where several times as much is being spent for control of *Anopheles punctipennis* as for reducing the prevalence of *Anopheles quadrimaculatus* and treatment is given to stream beds where it is known that no quadrimaculati are produced. Frequently it is not practical to separate the cost of anopheles control from that of general mosquito control, and therefore the cost of the latter is given as that of anopheles control, although at times it is several times more than what the cost of eliminating *Anopheles quadrimaculatus* would be.

In 1913 and 1914 the field working parties of the U. S. Public Health Service found that in Georgia, North Carolina and South Carolina when the *Anopheles quadrimaculatus* was not present there was very little or no history of transmission of malaria, though in some of the communities studied imported malaria carriers were present and *Anopheles punctipennis* were very numerous. This species was decidedly annoying to persons on porches after dusk but did not appear to frequent inhabited houses, though frequently found in the daytime in outhouses and unoccupied houses as well as under occupied homes raised from the ground.

The spending of millions of dollars annually for mosquito wire

* Read before the Public Health Engineering Section of the American Public Health Association at the Fifty-ninth Annual Meeting at Fort Worth, Tex., October 28, 1930.

screen seems to indicate that the public desire mosquito freedom and think more of that than of freedom from malaria. It is not unusual to find a large portion of the homes screened where no malaria exists and very few screened where malaria prevalence is unusually high.

During 1920, 45 towns and villages initiated malaria control campaigns. The cost per capita for anti-larval measures varied from $.42 to $2.52, and averaged $.80. During 1921, 26 other towns initiated similar campaigns and the cost per capita averaged $.72. These costs are from towns of 10 southern states for the first year's work and naturally include considerable installation of new ditches. The cost of maintenance the second year and thereafter will run about one-quarter to one-third of that of the first year. The anti-larval measures refer to ditching, maintenance of ditches, and application of larvicides, and the costs are of mosquito control not of *Anopheles quadrimaculatus* only.

In tropical countries having heavy rainfall, long rainy seasons and clay soils, the cost of larval control is relatively high and application of oil is unusually high because of interference of oil spread by quick growing vegetation.

While the Panama Canal was being constructed the cost of mosquito control activities, exclusive of screening homes, was approximately $.01 per capita per day. Of course, that meant operating about 300 days each year, while in the greater part of our malaria belt here the mosquito control period is only about 130 working days for the anopheles season. The annual rainfall at Panama is from 60 to 180 inches per year according to location. In our short anopheles season here we often have dry periods with less anopheles breeding area.

A cost of $3.65 per capita per year may seem high, but is actually relatively low as compared to average loss of wages when more than three-quarters of the people are suffering from malaria where preventive measures are not undertaken.

It is not generally known that millions of dollars are being spent in our southern states for the prevention of malaria by agencies developing hydro-electric power. Some of the artificial lakes being formed in our river valleys have shore lines varying from 12 to several hundred miles in length. Clearing of brush and trees from some of the larger projects to prevent anopheles production is decidedly expensive and exceeds ¼ million dollars for a single project. Where there are but 200 families within anopheles flight range of a lake that costs $100,000 to clear, the cost per family for protection from malaria is $500. In the *Southern Medical Journal*, May, 1930, Dr. L. T. Coggeshall reported that Lake Murray, being constructed near Columbia, S. C., will have an area of 75 square miles, a shore line of about 540

miles, and the cost of clearing will approximate 2½ million dollars. The annual interest on this sum is probably more than all state health departments are able to obtain to apply to malaria elimination.

With the discovery and use of Paris green as a larvicide for *Anopheles quadrimaculatus* we have a new condition—a larvicide that does not destroy the larvae of pestiferous mosquitoes, but which will often enable us to control anopheles at possibly one-quarter of the cost of destruction of all types of mosquito larvae. When there is much aquatic growth, brush, and floating débris present, we cannot always control anopheles production areas effectively and economically by the use of oil, but when we use Paris green mixed with hydrated lime such obstructions in no way interfere with dusting operations; so we have a quicker, cheaper and better means of control than formerly. In other countries this cheaper method is being widely used while with us, where the method originated from investigations of the U. S. Public Health Service, it is not yet in common use.

During 1929 Dougherty County (Ga.) Board of Health dusted with Paris green at 10-day intervals all *Anopheles quadrimaculatus* breeding areas in Dougherty County. The cost was $7,957, and the area of the county was 343 square miles. The cost per acre per season was $.036. In studies made in Tennessee it was found that in a stagnant stream bed about 5 feet wide, a man with a hand dust gun carrying a charge of 10 lb. of Paris green mixture could cover from 3,000 to 4,000 linear feet of stream bed per hour, depending on variation of air currents.

During this operation it was necessary for the operator to cross the stream a number of times because of the changing direction of the axis of the stream bed with respect to the prevailing direction of the wind. In dusting large areas throughout the anopheles season there will be considerable variation of cost depending on the amount and frequency of rainfall. In county-wide dusting operations to date, the cost for labor and Paris green mixture for the entire territory (wet and dry included) varied from ⅓ to ½ cent per acre per dusting, but of course this cost may vary more widely according to the extent of wet area of any county that is suitable for *Anopheles quadrimaculatus* production.

In some states and counties we find malaria prevalent in sparsely settled rural districts. Where the income of such counties is small and the counties are not yet ready to undertake larval control as a malaria control measure, screening of farm homes and of farm tenant homes should be considered. During the summer of 1927 the Red Cross and the U. S. Public Health Service screened about 8,000 farm tenant homes in the flood area of the Mississippi River in 4 states. The average cost was $10 per home. In the counties of Mississippi there was

an average of 3-and-a-fraction screen doors per home. As this malaria protection measure lasts for from 4 to 5 seasons, and even longer where the screen is painted, the cost per year averages from $2 to $2.50 per family per year for the first 5 years. As reinforced doors are used they last a long time, and those installed in 1922 are as good as when first installed. For an average family of 5 this cost becomes about $.50 per person per year.

Eight county health officers have already undertaken screening campaigns and one of them visited the hardware dealers of his county to find out whether his activities were decreasing the sale of screening by hardware dealers. He was told that since his campaign got under way from two to three times the normal amount of window screen and screen doors had been called for. It has also been noticed that where county-wide screening campaigns are undertaken a considerable number of tenants and owners build their own screen doors, and then the cost per capita per year is considerably reduced, as this work is done in spare time. Where tenants buy and use the cheapest type of screen door they can get, they should be advised to reinforce doors on both sides with 22 gauge galvanized iron, 6 inch right triangles in order to double the life of the doors.

In some of the counties having the highest malaria prevalence a large portion of the farm tenant families are spending almost as much for bed mosquito bars as it would cost to keep the house effectively mosquito proof. Most of these bed nets have holes in them. Many sanitarians, as well as these people, are unaware that a mosquito bar is a preferential resting place for anopheles and that more than half of the people who sleep under bed nets are bitten while they are asleep when they come into contact with the cotton mesh. Of all measures used by the American public for malaria control the use of bed nets is the poorest and probably the most expensive considering the small benefit actually received.

It does not take long to persuade colored farm tenants to care for the screen protection on their homes. It is essential to do so. In one of the Mississippi River counties the owner of the largest cotton plantation area states that the screening of his colored farm tenant homes and keeping them screened is the best investment he ever made.

It is unfortunate that we have the greatest proportion of unscreened homes in rural areas having the highest malaria rates, and the property owners do not yet realize that unseen taxes are collected from them which greatly exceed the cost of screening of farm tenant homes. County health workers will find that it is in this type of home that we have most sickness and most fly-borne disease.

Screening and Mosquito Proofing as Elements in Malaria Control*

HOWARD R. FULLERTON, C. E.

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THE Tennessee State Health Department program is essentially a county health department program. With this in mind, our county-wide malaria control programs have been built up around the full-time county health departments, and the malaria program has been made an active part of their work and sponsored locally by them. The local health departments do not do malaria control work exclusively, but carry it along as one of their major activities in their general health work. There are 9 full-time county health departments in that section of the state in which malaria is of public health significance, 5 of them located in the counties having the highest malaria morbidity and mortality.

The principal malaria control problem lies in the western third of the state between the Tennessee River, which traverses the entire width of the state, and the Mississippi, our western boundary. This area is approximately 100 miles long and 100 miles wide, mostly flat, with many low hill sections. Streams are sluggish, and there are many places for mosquitoes to breed in easy flight range of most of the houses. In this section the Tennessee Department of Public Health has concentrated its major malaria control activities. Screening and other mosquito proofing of houses have been the major activities. These are important methods of malaria control, particularly where other methods of county-wide control are not economically feasible, or have not been developed far enough to demonstrate that they will insure fair results for money spent.

Screening alone must not be confused with mosquito proofing. In a large percentage of tenants' homes in Tennessee screening of the doors and windows is only part of the job of preventing the ingress of anopheles. Carpenter work is often necessary, floor cracks have to be stopped up or covered, walls papered to cover cracks or holes, naphthalene put into the chimneys and other work done. In addition, inten-

* Read before the Public Health Engineering Section of the American Public Health Association at the Fifty-ninth Annual Meeting at Fort Worth, Tex., October 28, 1930.

sive educational programs are carried on emphasizing the proper use and care of the screens as well as general malaria prevention.

Three municipalities have recently passed city-wide house screening and mosquito control ordinances: Memphis, Humboldt, and Milan, with populations of 252,000, 4,500 and 3,500, respectively. Memphis at present has one of its best sanitary officers devoting his full time to this work. He has the advantage of the previous experiences of the Shelby County Health Department in methods of promotion, measuring for screening, making and hanging screen doors, and observing the various other methods of mosquito proofing.

Before we advocate a screening program, a careful study is made of the malaria incidence. This is usually a combination of case histories, blood indexes of school children, both white and colored, and spleen examinations.

The first screening in Tennessee was done in Lake, Shelby, Dyer and Lauderdale Counties, by the American Red Cross, in 1927, after the big Mississippi River flood of that year. At present, Lake, Shelby and Gibson Counties have county-wide screening programs. Because the financing and general procedure in each of the 3 counties is quite different, it will be of interest to discuss briefly each of the plans.

LAKE COUNTY MOSQUITO PROOFING PROGRAM

Lake County is low and flat and lies between Reelfoot Lake and the Mississippi River. The county is traversed with sloughs, and almost every house is within flight range of a quadrimaculatus breeding place. Cotton is the chief crop, and there are only two towns in the county, neither of which is over 1,200 in population. The population is of the tenant-farmer type and some 12 land owners control or own possibly 80 per cent of the land.

Early in 1928 the larger land owners were invited to a meeting, which included several county officials. A county antimalaria committee was formed, consisting of 5 principal land owners, 1 from each section of the county. This committee provided a revolving fund of $600 and secured from hardware and lumber firms a 90-day credit allowance, equivalent to approximately $2,000, total assets to be used by the committee for the manufacture of screen doors. Excellent factory quarters were obtained free of charge, and equipment used by the Red Cross in 1927 was installed.

The doors were patterned exactly in accordance with the design of the U. S. Public Health Service. A door identification card was developed, also other forms for adequate house surveys to show sizes and direction of swing of doors, sizes of windows, and other data. At

present, approximately 90 per cent of the county has been screened.

One large land owner gave us to understand, early in the campaign, that she would never do any screening. We screened all around her property, and when tenants began to move to other places where mosquito proofing was available, she changed her mind. Needless to say, her own house was completely screened with 16-mesh wire.

For mosquito proofing the walls and ceilings, we have utilized used cotton sample paper. This is very tough and heavy, difficult to tear, and is used to wrap up cotton samples for shipping. Thousands of pounds of this are received in Memphis yearly, and not used again. However, local junk dealers buy all of this paper possible; hence, we have keen competition in securing it. We secured many tons free from philanthropically inclined cotton dealers, and later through the endorsement of the Memphis Cotton Exchange we were given all paper from each member firm except one.

The paper is 4 ft. wide and comes in varying lengths, from 2 to about 15 ft. The enormous amount required to paper an entire county is indicated by the fact that at one time, in Lake County, we had enough paper to cover a wall 8 ft. high and 13 miles long.

Shelby County Health Department collects the paper by truck on regular schedule; at some places every day, at some every other day, and at others not so frequently. It is then rerolled in small bundles, which reduces waste and enables the distributor to leave more nearly

TABLE I. POUNDS OF PAPER FOR ROOMS. *Cotton Sample Paper Only*

NOTE—1 pound of paper covers 34 square feet. No allowance made for doors and windows

Length in feet	Width of room in feet												
	6	7	8	9	10	11	12	13	14	15	16	17	18
	Ceiling 7 feet high												
6	6.4	7.0	7.6	8.2	8.9	9.5	10.1	10.5	11.3	12.0	12.6	13.2	13.8
7	7.0	7.7	8.3	9.0	9.7	10.3	10.9	11.6	12.3	13.0	13.7	14.4	15.1
8	7.6	8.3	9.0	9.7	10.4	11.1	11.8	12.5	13.3	14.0	14.7	15.4	16.1
9	8.2	9.0	9.7	10.4	11.1	11.8	12.6	13.3	14.0	14.7	15.4	16.1	16.8
10	8.9	9.7	10.4	11.1	11.8	12.5	13.3	14.0	14.7	15.4	16.1	16.8	17.5
11	9.5	10.3	11.1	11.8	12.5	13.3	14.0	14.7	15.4	16.1	16.8	17.5	18.2
12	10.1	10.9	11.8	12.6	13.3	14.1	14.9	15.7	16.5	17.2	18.0	18.8	19.6
13	10.6	11.6	12.5	13.3	14.2	15.1	16.0	16.9	17.8	18.7	19.6	20.4	21.3
14	11.3	12.3	13.3	13.9	14.7	15.6	16.5	17.4	18.3	19.2	20.1	21.0	21.9
15	12.0	13.0	14.0	14.9	15.8	16.7	17.5	18.4	19.3	20.2	21.1	22.0	22.8
16	12.6	13.7	14.7	15.6	16.6	17.7	18.6	19.6	20.5	21.5	22.4	23.4	24.1
17	13.2	14.4	15.4	16.4	17.4	18.5	19.6	20.5	21.6	22.5	23.5	24.6	25.6
18	13.8	15.1	16.1	16.8	17.5	18.2	19.6	21.3	21.9	22.8	24.1	25.6	26.3

TABLE I (*Cont.*). POUNDS OF PAPER FOR ROOMS. *Cotton Sample Paper Only*

Length in feet	Width of room in feet												
	6	7	8	9	10	11	12	13	14	15	16	17	18
	Ceiling 8 feet high												
6	7.2	7.8	8.5	9.2	9.9	10.6	11.3	12.0	12.7	13.4	14.1	14.8	15.5
7	7.8	8.5	9.3	10.1	10.8	11.5	12.3	13.1	13.9	14.7	15.5	16.0	16.5
8	8.5	9.2	10.0	10.7	11.5	12.2	13.0	13.7	14.5	15.2	16.0	16.7	17.5
9	9.2	10.0	10.7	11.4	12.2	12.9	13.6	14.4	15.1	15.8	16.6	17.7	18.5
10	9.9	10.7	11.5	12.3	13.1	13.9	14.7	15.5	16.3	17.1	17.9	18.7	19.5
11	10.6	11.5	12.3	13.1	14.0	14.8	15.6	16.4	17.3	18.1	18.9	19.7	20.6
12	11.3	12.2	13.1	13.9	14.8	15.7	16.5	17.4	18.3	19.1	20.0	20.9	21.7
13	12.0	12.9	13.8	14.7	15.6	16.5	17.4	18.3	19.2	20.1	21.0	21.9	22.8
14	12.7	13.5	14.3	15.2	16.0	16.8	17.7	18.5	19.3	21.2	22.0	22.9	23.9
15	13.4	14.3	15.3	16.3	17.2	18.2	19.2	20.1	21.1	22.1	23.0	24.0	25.0
16	14.1	15.1	16.1	17.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0
17	14.8	15.8	16.8	17.8	18.9	19.9	20.9	21.9	23.0	24.0	25.0	26.1	27.1
18	15.5	16.5	17.5	18.5	19.5	20.6	21.7	22.8	23.9	25.0	26.0	27.1	28.2
	Ceiling 9 feet high												
6	7.9	8.7	9.4	10.1	10.8	11.7	12.4	13.1	13.8	14.5	15.3	16.4	17.0
7	8.7	9.4	10.2	11.0	11.8	12.6	13.4	14.2	15.0	15.8	16.6	17.4	18.1
8	9.4	10.3	11.2	12.0	12.8	13.6	14.4	15.2	16.0	16.8	17.6	18.4	19.2
9	10.1	11.0	11.8	12.7	13.5	14.3	15.2	16.0	16.9	17.8	18.7	19.5	20.3
10	10.8	11.7	12.4	13.3	14.2	15.1	16.0	16.8	17.7	18.5	19.4	20.4	21.4
11	11.7	12.6	13.5	14.4	15.3	16.2	17.1	18.0	18.9	19.8	20.7	21.6	22.5
12	12.4	13.4	14.4	15.3	16.2	17.1	18.0	18.9	19.8	20.7	21.6	22.5	23.6
13	13.1	14.1	15.1	16.1	17.1	18.0	18.9	19.8	20.7	21.6	22.5	23.5	24.7
14	13.8	14.8	15.8	16.8	17.8	18.8	19.8	20.8	21.8	22.8	23.8	24.8	25.8
15	14.5	15.6	16.7	17.8	18.8	19.8	20.8	21.8	22.8	23.8	24.9	25.9	26.9
16	15.3	16.3	17.4	18.5	19.5	20.6	21.6	22.6	23.6	24.6	25.7	26.8	28.0
17	16.2	17.3	18.4	19.5	20.6	21.6	22.6	23.7	24.7	25.8	26.9	28.0	29.1
18	17.0	18.1	19.2	20.3	21.4	22.5	23.6	24.7	25.8	26.9	28.0	29.1	30.2
	Ceiling 10 feet high												
6	8.1	9.2	10.3	11.4	12.6	13.7	14.8	15.9	17.0	18.1	19.3	20.4	21.6
7	9.2	10.3	11.4	12.5	13.6	14.7	15.8	16.9	18.0	19.1	20.2	21.3	22.5
8	10.3	11.4	12.5	13.6	14.7	15.8	16.9	18.0	19.1	20.2	21.3	22.4	23.5
9	11.4	12.5	13.6	14.7	15.8	16.9	18.0	19.1	20.2	21.3	22.4	23.4	24.5
10	12.5	13.5	14.6	15.6	16.7	17.7	18.8	19.9	21.0	22.1	23.2	24.3	25.4
11	13.6	14.6	15.7	16.8	17.8	18.9	20.0	21.1	21.2	22.3	23.4	24.6	26.3
12	14.7	15.7	16.7	17.8	18.8	19.9	20.9	22.1	23.2	24.1	25.1	26.1	27.2
13	15.8	16.9	18.0	19.1	20.2	21.3	22.4	23.5	24.6	25.7	26.8	28.0	28.1
14	16.9	18.0	18.1	20.2	21.3	22.4	23.5	24.6	25.7	26.8	27.8	28.8	29.0
15	18.1	19.0	20.1	21.1	22.2	23.3	24.4	25.4	26.4	27.4	28.4	29.4	29.9
16	19.2	20.2	21.2	22.3	23.4	24.5	25.4	26.4	27.3	28.5	29.5	30.5	30.8
17	20.4	21.3	22.2	23.1	24.0	25.0	25.9	26.8	27.7	28.6	30.6	31.6	31.7
18	21.6	22.5	23.4	24.3	25.2	26.1	27.1	28.0	29.9	30.8	31.7	32.6	32.6

the exact amount needed at each house. This health department not only collects the paper free of charge, but stores it and gives away a proportionate amount of it to the other county health departments needing it.

A table is used showing amounts of paper necessary in pounds for various sized rooms, varying in height from 7 to 10 ft., inclusive, in width from 6 to 18 ft., inclusive, and in length from 6 to 18 ft., inclusive (see Table I). With this table, a sanitary inspector can tell at a glance, after measuring up the room, exactly the amount of paper needed, put it down on his survey sheet in the field, and not have a mass of calculating to do in the office. A "tack factor" is also given on the paper table, so that the amount of tacks needed can be immediately determined.

In Lake County, we believe we have the first county in the United States with county-wide house numbering. The county is divided into 8 districts and the houses in each are numbered serially. The first digit in each house number is the number of the civil district in which the house is located. This method enables one to know at once the exact location of each house. The house locations were spotted on maps, so that the health officer, nurse, or sanitary officer can easily find them. This system enables the numbering to be carried on satisfactorily as new houses are built in each district, and not have perchance a very large number alongside of a small one.

This is the only method by which houses can be positively identified from year to year, where there is a large tenant turnover. For example, where there are 20 houses scattered over a farm and the tenants change houses or new ones come in, there is no other method of identification that is so accurate as numbering. Numbering is of distinct value to the health officer with regard to other activities, such as locating cases of communicable disease. He, or any member of his staff, can go directly to a house and not spend a long time in finding the place in which a call of a few minutes is to be made. It also aids in mapping locations of satisfactory water supplies and sanitary privies.

I would like to refer particularly to the cost of numbering the houses in Lake County. The numbers were hand-stamped on galvanized sheet iron plates 1″ x 3″ by a sanitary officer. The sheet iron was waste, secured free from furnace and tin repair shops, and later cut to the desired size. The numbers were stamped on the metal with steel number punches, each figure being ½ inch high. The set of number punches (0 to 9, inclusive) cost $3.50. The numbers were nailed on the houses directly over the front door, or near the top of it, with a nail in each end of the plate to make removal difficult. Exclusive of the time of the sanitary officer, during which he was incidentally engaged in a general house-to-house survey, it is estimated that the total cost of the county-wide house numbering has been not more than $10.

TABLE II

SCREEN AREA SHEET

NOTE—Add 5 per cent for waste to figures below

Length in inches	Width in inches												
	24	26	28	30	32	34	36	38	40	42	44	46	48
	Area of screen in square feet												
24	4.0	4.3	4.7	5.0	5.3	5.6	6.0	6.3	6.7	7.0	7.3	7.7	8.0
26	4.3	4.7	5.1	5.4	5.8	6.1	6.5	6.9	7.2	7.6	7.9	8.3	8.7
28	4.7	5.1	5.4	5.8	6.2	6.6	7.0	7.4	7.8	8.2	8.6	8.9	9.3
30	5.0	5.4	5.8	6.3	6.7	7.1	7.5	7.9	8.3	8.8	9.2	9.6	10.0
32	5.3	5.8	6.2	6.7	7.1	7.6	8.0	8.4	8.9	9.3	9.8	10.2	10.7
34	5.7	6.1	6.6	7.1	7.5	8.0	8.5	9.0	9.4	9.9	10.4	10.9	11.3
36	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0
38	6.3	6.9	7.4	7.9	8.4	9.0	9.5	10.0	10.5	11.1	11.6	12.1	12.7
40	6.7	7.2	7.8	8.3	8.9	9.5	10.0	10.6	11.1	11.6	12.2	12.8	13.3
42	7.0	7.6	8.2	8.8	9.3	9.9	10.5	11.1	11.7	12.3	12.8	13.4	14.0
44	7.3	7.9	8.6	9.2	9.7	10.4	11.0	11.6	12.2	12.8	13.4	14.1	14.7
46	7.7	8.3	8.9	9.6	10.2	10.9	11.5	12.2	12.8	13.4	14.0	14.7	15.3
48	8.0	8.7	9.3	10.0	10.7	11.3	12.0	12.7	13.3	14.0	14.6	15.4	16.0
50	8.3	9.0	9.7	10.4	11.1	11.8	12.5	13.2	13.9	14.6	15.3	16.0	16.7
52	8.7	9.4	10.1	10.8	11.5	12.3	13.0	13.7	14.4	15.2	15.9	16.6	17.3
54	9.0	9.7	10.5	11.3	12.0	12.8	13.5	14.3	15.0	15.8	16.5	17.3	18.0
56	9.3	10.1	10.9	11.7	12.4	13.2	14.0	14.8	15.5	16.3	17.1	17.9	18.7
58	9.7	10.5	11.3	12.1	12.9	13.7	14.5	15.3	16.0	16.9	17.7	18.6	19.3
60	10.0	10.8	11.7	12.5	13.3	14.2	15.0	15.9	16.6	17.5	18.3	19.2	20.0
62	10.3	11.2	12.1	12.9	13.8	14.7	15.5	16.4	17.1	18.1	18.9	19.8	20.7
64	10.7	11.5	12.4	13.3	14.2	15.1	16.0	17.0	17.7	18.6	19.5	20.5	21.3
66	11.0	11.9	12.8	13.8	14.7	15.6	16.5	17.5	18.2	19.3	20.1	21.1	22.0
68	11.3	12.3	13.2	14.2	15.1	16.1	17.0	18.0	18.8	19.8	20.7	21.8	22.7
70	11.7	12.7	13.6	14.6	15.6	16.6	17.5	18.6	19.3	20.4	21.4	22.4	23.3
72	12.0	13.0	14.0	15.0	16.0	17.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0
74	12.3	13.4	14.4	15.4	16.5	17.5	18.5	19.5	20.6	21.6	22.6	23.6	24.7
76	12.7	13.7	14.8	15.8	16.9	18.0	19.0	20.0	21.1	22.2	23.2	24.3	25.3
78	13.0	14.1	15.2	16.3	17.4	18.4	19.5	20.6	21.7	22.8	23.8	24.9	26.0
80	13.3	14.4	15.6	16.7	17.8	18.9	20.0	21.1	22.2	23.3	24.4	25.6	26.7
82	13.7	14.8	16.0	17.1	18.3	19.4	20.5	21.7	22.8	23.9	25.1	26.2	27.3

GIBSON COUNTY MOSQUITO PROOFING PROGRAM

Gibson County is engaged chiefly in produce and fruit growing with cotton and corn as additional crops. The population is about 45,000. An increase in incidence of malaria during the past few years made it imperative to institute malaria control measures by the county health department. Inasmuch as there were no county funds available for such work, and the sanitary inspectors were fully occupied with sanitation problems, a modified screening program was decided upon.

In Gibson County, nearly every lumberyard owner manufactures screen doors, as well as sells those of general commercial manufacture.

Each lumber dealer and hardware merchant was interviewed in regard to making and selling the U. S. Public Health Service type of door. Most of the hardware men had friends who were lumber dealers who would make screen doors for them at a price which would allow them a profit. A meeting of all dealers was held and $2.25 per door agreed upon. The dealers also agreed not to sell any more screen wire with a mesh larger than 16 to the inch after the stocks on hand were exhausted. Several of them had been selling only 16-mesh wire for a long time. The County Health Department agreed to do all of the propaganda work through the newspapers, and the State Department of Health loaned its journalist to write articles concerning the program and the particular type of screening. These were distributed regularly to each newspaper in the county.

The towns of Humboldt and Milan both passed home mosquito proofing ordinances as well as the standard mosquito ordinance of the U. S. Public Health Service declaring it a nuisance to raise mosquitoes on private premises.

There are 8 incorporated towns in Gibson County, so distributed geographically that citizens can secure U. S. Public Health Service type screen doors and 16-mesh wire from their local dealers in any section of the county.

SHELBY COUNTY MOSQUITO PROOFING PROGRAM

Memphis is located in Shelby County. There is a densely populated district adjoining the city on three sides. The county is largely composed of low lying hills, bordered on the west by the Mississippi River and traversed by two fair sized rivers and a number of creeks. Cotton and corn are the principal crops. There are many small communities scattered throughout the county.

The county-wide screening campaign was started by the organization of an antimalaria committee with an active general chairman who is vested with power to act in accepting contracts, paying bills, and in the general conduct of the screening. The county commissioners gave $1,000 for a revolving fund and, in addition, furnished trucks free of charge for the transportation of screen doors and screen wire, collection and distribution of paper, and for other materials and labor.

One reason for the success of screening in Shelby County is that all of the sanitary officers were put through a rigid training in screening. They were taken into the field and taught how to measure doors and windows. Afterward, they went into the shops and actually made the doors and then hung them, and screened the windows. In this course of training they were taught to measure up and inspect screening:

hence their efficiency in screening promotion work was very much improved. When they were sent out to sell screening, they were able to tell about it intelligently because they had done it themselves.

OTHER WORK SUPPLEMENTARY TO SCREENING

The Tennessee Department of Public Health has an all around balanced malaria control program. In addition to screening and often supplementary to it, it is carrying on active programs in:

Impounded water control
Municipal mosquito control
Consultant service to city and county health officers on special malaria control problems
Combined land reclamation and mosquito control
Plasmochin demonstration and studies
Schoolchild surveys in spring and fall for malaria in certain counties
Paris green dusting
Roadside borrow pit control
1. State Highways:
   By clause in State Highway specifications, requiring proper drainage of all borrow pits along state highways.
   By a definite contract, the State Highway Department is now draining borrow pits along state highways left undrained before establishing the drainage clause.
2. County Highways:
   Similar programs are being worked out for county roads.

Pasteurization of Milk

EXPERIENCE has shown that where pasteurization (the heating of milk under conditions which insure the destruction of harmful bacteria, yet leave the vitamins unimpaired) is generally practised, infection traceable to milk recedes almost to vanishing point. This fact has led no fewer than 21 cities in the United States to ordain the compulsory pasteurization of milk.

The signatories, while expressing no opinion on the principle of compulsion, are emphatically agreed that the time has arrived when, in order to increase milk consumption and diminish the risk of milk infection, pasteurization should be universally recognized as the immediate practical method of insuring safety. They record their satisfaction at the fact that about 90 per cent of the London supply is pasteurized with markedly beneficial results.

They are of the opinion that the first step in educating the public to demand pasteurized milk should be the simplification of the present milk grading system and the clear labelling of pasteurized milk as such. They are further of opinion that while no effort should be relaxed to improve milk at the source, the entire milk-supply—excepting "Certified milk"—should be pasteurized.—From Letter to Editor of *The Lancet* from Lord Dawson of Penn and others, Dec. 13, 1930.

The Olean City Epidemic of Typhoid Fever in 1928*

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AN epidemic of 248 cases of typhoid fever occurred at Olean, N. Y., in the fall of 1928. This was due to a break in the submerged suction pipeline from a well in the Allegheny River and insufficient chlorination of the water supplied to the city. Of the total number of persons infected, 214 were residents of Olean City. Of the remainder 18 were from Cattaraugus County, 9 from elsewhere in New York State, 6 from the adjoining State of Pennsylvania, and 1 from West Virginia. The case incidence for the residents of Olean City, with an estimated population of 21,599 in 1928, was almost exactly 1 per cent of the population. There were 25 deaths, including 20 residents of Olean City, giving a 10.1 per cent fatality rate for the total cases.

The investigation and management of the typhoid epidemic during October and November, 1928, were under the supervision at Olean of Dr. B. E. Roberts, State Epidemiologist. The annual report of the New York State Department of Health for 1928[1] records the epidemiological features of the outbreak which was easily shown to be waterborne.

City water was used by all the persons affected and there was no other factor common to a significant proportion of the cases. There were in Olean over 1,000 cases of gastroenteritis in January and February, 1928, and over 5,000 during the latter half of August and the first half of September, prior to the onset of most of the typhoid fever.

The water supply of Olean was derived from two sources, Olean Creek and South Olean wells. Olean Creek water, which was filtered, chlorinated, and pumped into the distribution system at North Olean, was found by daily tests to contain residual chlorine and to be free from *B. coli*. The auxiliary South Olean well supply came from 12 or more 6″ and 8″ tubular wells sunk about 72′ deep in the low ground

* Read before the Epidemiology Section of the American Public Health Association at the Fifty-ninth Annual Meeting at Fort Worth, Tex., October 27, 1930.

on the north side of the Allegheny River and from a large open collection and suction well on the south bank of the river. Two of the tubular wells had become submerged within recent years by changes in the course of the river. Water from these wells passed by screw-joint iron suction pipes across the river bed to the collection and suction well. After chlorination, instituted by a device which operated by remote control when the electric pump was started, the water was forced into the distribution system. Raw sewage from nearly half the city entered the river and its tributary above the wells.

On September 8, 1928, a man heard a suction noise in the vicinity of one of the submerged wells and reported it to the city water department. On September 10 the suction pipe leading from a submerged well was found to be broken and the well was cut out. Early in the morning of September 13 the use of water from the South Olean wells was discontinued for all time.

There was failure to make daily or regular tests of the South Olean water for residual chlorine, so additional chlorine was not added to take care of the polluted river water. Nine of 16 South Olean water samples examined at the city water department laboratory in July, August, and September, gave presumptive tests for *B. coli*, and a sample of water taken on September 13 at the Cattaraugus County Laboratory in Olean contained confirmed *B. coli*.

The typhoid epidemic cases were concentrated more than the population in the southern and central parts of Olean, which were supplied most directly with South Olean well water.

FIGURE I—Tubular Well in Allegheny River

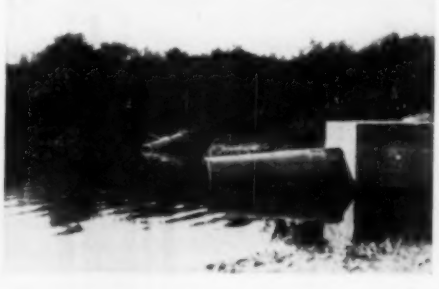


FIGURE II—Sewer Outlet at Allegheny River

DATES OF FIRST SYMPTOMS OF TYPHOID FEVER

The dates of first symptoms of typhoid fever for the 248 patients, including 8 known secondary cases, are shown by the accompanying histogram (Figure III). Ninety-seven per cent of the onset dates for the primary cases from August 21 to December 8, 1928, were in Sep-

TABLE I

INCUBATION PERIOD OF TYPHOID FEVER FOR EIGHT OLEAN VISITORS

Patient			Incubation Period in Days	
Initials	Sex	Age	Range	Mean
C. N. G.	M	38	3–5	4
H. W.	M	24	8–10	9
D. G.	F	15	10	10
C. W. G.	M	38	10–12	11
I. O. W.	M	51	18	18
D. C. O.*	M	12	23–25	24
L. S.	F	29	26	26
M. B.	M	19	29–30	29.5
Mean		28		16.4
Median		26		14.5
Range		12–51	3–30	4–29.5

* Died.

tember and October, including 74 per cent in September. There were 18 cases with onsets on each of 3 days, September 23, 27, and 30. One hundred twenty-eight patients or more than half the total had first symptoms during the 9 days September 23 to October 1, for which September 27 is the mid-date.

FIGURE III

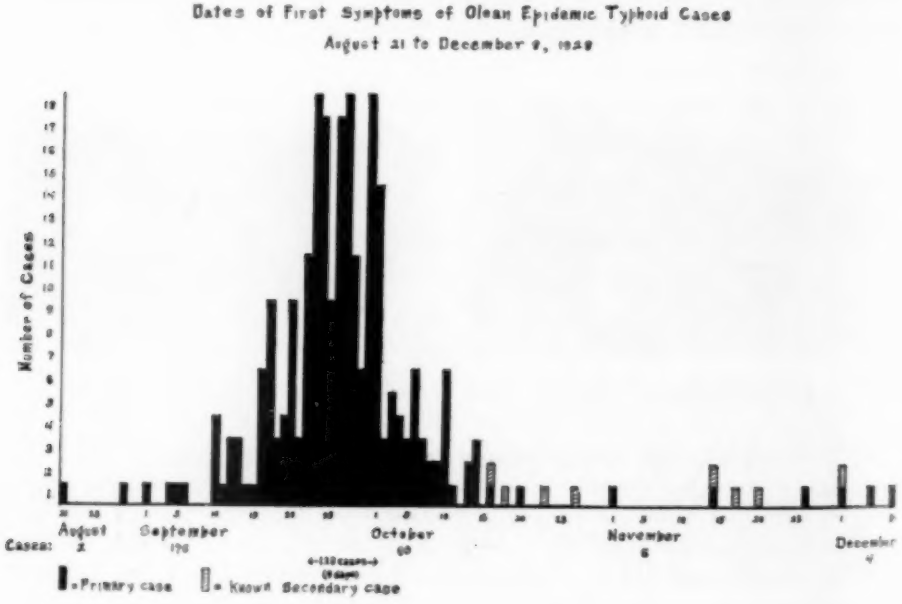


TABLE II

Epidemic	Number of Cases Used	Incubation Period in Days	
		Mean	Range
Mankato, Minn., in 1908	21	13.81	5–29
Excursion steamer reported by Lumsden in 1912	13	19.38	7–38
Old Salem Chautauqua reported by Ferguson in 1916	181	19.50	7–40

There was one visitor to Olean on August 11 and there were 7 from September 8 to 12, inclusive, for from 1 to 3 days, who later developed typhoid fever (Table I). Assuming that infection occurred on the mid-day, the mean incubation period was 16.4 days and the range was from 4 to 29.5 days.

As noted previously, the mid-date for the most of the typhoid cases was September 27. This was 17 days after the removal of the defective pipe in the Allegheny River.

The mean incubation periods for other water-borne typhoid epidemics are given by Miner in Table II.[2]

The 8 Olean typhoid cases had a mean incubation period midway

TABLE III

AGE AND SEX OF OLEAN TYPHOID CASES AND DEATHS

Age Group	Total in Epidemic				Olean City Residents			
	Cases		Deaths		Cases		Deaths	
	M	F	M	F	M	F	M	F
Under 5	7	4	0	1	4	4	0	1
5–9	10	9	2	0	9	9	1	0
10–14	15	16	0	3	13	16	0	3
15–19	13	17	1	2	12	16	1	2
20–24	21	9	0	2	17	7	0	1
25–29	15	15	1	2	11	9	1	1
30–34	14	8	2	0	13	8	2	0
35–39	8	10	0	1	5	10	0	1
40–44	8	7	0	1	6	7	0	1
45–49	6	7	1	1	6	6	1	0
50–54	10	7	1	0	9	6	1	0
55–59	1	3	1	0	1	3	1	0
60–64	1	1	0	0	1	1	0	0
65–69	1	2	1	0	1	2	1	0
70–74	3	0	2	0	2	0	1	0
All Ages	133	115	12	13	110	104	10	10
Total	248		25		214		20	

between that for the Mankato patients and the periods for the individuals in the other two epidemics.

Sex—There were 18 more males than females among the 248 persons who had typhoid fever, including an excess of 12 males in the list of 34 patients who were not residents of Olean City. The percentage of males for the Olean residents was 51.4 and for the non-residents 67.6.

Age—The ages of the 248 patients ranged from a female contact case 18 months old and a female primary case 34 months old, to a male primary case 74 years of age. There were 11 children, including 7 males, under 5 years of age, 19 more 5 to 9 years and 12 persons of 55 years and over. The remaining 206, or 83 per cent of the total, were age 10 to 54 years.

All who had typhoid fever were white persons except for a male negro, age 54 years. According to the state census in 1925 there were in Olean 229 colored persons.

TABLE IV

TYPHOID ATTACK RATES FOR OLEAN CITY RESIDENTS BY AGE GROUPS

Age Group	Population *	Typhoid Cases among Olean City Residents	
		Number	Per 1,000 Population
Under 5	2,264	8	3.5
5–9	2,070	18	8.7
10–14	1,962	29	14.0
15–19	1,789	28	15.6
20–24	1,962	24	12.2
25–29	1,919	20	10.4
30–34	1,789	21	11.7
35–39	1,682	15	8.9
40–44	1,358	13	9.5
45–54	2,221	27	12.2
55–64	1,552	6	3.9
65 and over	991	5	5.0
Total	21,559	214	9.9

* Population of Olean City July 1, 1928, is based on 1920 and 1930 federal censuses.

Among the Olean City residents the typhoid attack rate was relatively low in the age groups under 5 years and 55 years and over, and high in the age groups 10 to 34 years and 45 to 54 years.

The case fatality rate for the patients under 20 years of age was 9.9, for those ages 20 to 44 years 7.8, and those age 45 years and over 15.8. The males under 20 years of age had a fatality rate of 6.7 in comparison with one of 13.0 for the females, and the males age 20 to

44 years a rate of 4.5 to one of 12.2 for the females. The males age 45 years and over on the other hand had a case fatality rate of 27.3 compared with a figure of only 5.0 for the females (Table V).

The mean length of life after the first symptoms of typhoid fever for the 25 patients who died was 29 days. The 12 males lived, on an average, 5 days longer than the 13 females. The shortest period of illness resulting in death was 9 days and the longest 52 days (Table VI).

Laboratory records of 2,497 specimens obtained from 234 Olean typhoid patients during and after their illnesses are shown in Table VII.

The 248 typhoid cases have been classified by laboratory test results. The blood agglutination test was extensively used to confirm the diagnosis. The isolation of the typhoid bacillus from feces and urine was generally attempted only for the purpose of determining carriers. Less than 30 days after the onset of illness the blood Widal was reported positive for 165 individuals and partial for 12 more, but *B. typhosus* was isolated from the feces of only 17 and from the urine of but 3 persons.

In all, the blood widal was positive for 171 individuals, including 22 who had previously had typhoid vaccine, partial for 14 more, including 2 who had received the vaccine, negative for 13, including 2 who recently had been given typhoid vaccine, and not known for 50, of whom 5 died.

The mean length of time after the onset of illness, as stated on the record sheets, that the Widal was discovered to be positive for 149 persons who had never had typhoid vaccine was 13 days. The median was 11 days, the mode 6 days, and the range 2 to 93 days.

For 6 patients without typhoid vaccine the Widal on an average was negative 8.5 days and positive 13 days after the onset of illness; for 8 more the Widal was partial 14 days and positive 17 days after the first symptoms of typhoid fever.

TYPHOID CARRIERS PRESENT BY MONTHS

The duration of the persistence of typhoid bacilli in both the feces and urine or in one or the other has been determined for 211 patients for whom there were release specimens. All the 248 typhoid cases were included except the 25 who died and 12 who lived away from Olean and submitted no release specimens.

Typhoid bacilli were found in the feces or urine of 88 of the 211 persons at some time. The total number of typhoid carriers at the end of the first month after the onset of illness was 78, assuming that

TABLE V

OLEAN TYPHOID CASE FATALITY RATES BY AGE AND SEX

Age Group	Sex	Cases	Deaths	Deaths per 100 Cases
Under 20	M	45	3	6.7
	F	46	6	13.0
	M & F	91	9	9.9
20–44	M	66	3	4.5
	F	49	6	12.2
	M & F	115	9	7.8
45 and over	M	22	6	27.3
	F	20	1	5.0
	M & F	42	7	15.8
Total	M	133	12	9.0
	F	115	13	11.3
	M & F	248	25	10.1

TABLE VI

DURATION OF TYPHOID FEVER FOR 25 DEATHS

Sex	Number of Persons	Days from First Symptoms of Typhoid to Death		
		Mean	Median	Range
Male	12	32	31	10–52
Female	13	27	26	9–44
Total	25	29	27	9–52

TABLE VII

LABORATORY EXAMINATIONS FOR OLEAN TYPHOID CASES

Examination	Persons	Specimens				
		Total	Positive		Partial	
	No.	No.	No.	Per cent	No.	Per cent
Feces	217	1,205	535	45		
Urine	214	1,042	185	18		
Widal	197	217	175	81	23	11
Blood Culture	30	30	18	60		
Bile	2	3	2	67		
Total	234	2,497	915	37	23	11

individuals who were found in later months to be excreting typhoid bacilli did the same earlier. At the close of the third month there were 24 carriers, or 11.4 per cent of the 211 individuals for whom there were release specimens. After 5 months there were no persons who excreted typhoid bacilli in the urine alone.

The number of typhoid carriers at the end of 6 months was 14, or 6.6 per cent of the patients examined, and at the close of 8 months was 12, or 5.7 per cent. The latter 12 have remained typhoid carriers for over 16 months, or as long as tests have been made.

Typhoid bacilli were found in the feces of 63 of the 211 persons at some time. The number of fecal typhoid carriers at the end of the first month after the onset of illness was 55 and at the close of the third month was 20, or 9.5 per cent of the persons examined. After the fifth month the numbers of fecal typhoid carriers were the same as those given in the preceding tabulation for fecal and urinary carriers.

Typhoid bacilli were discovered in the urine of 53 persons. The number of urinary carriers at the end of the first month after the onset of illness was 51 and at the close of the third month was 18, or 8.6 per cent of the 209 individuals for whom there were release specimens. One month later there were 13, or 6.2 per cent. At the termination of 5 months the urinary carriers numbered 9, or 4.3 per cent of the persons examined. The typhoid bacilli were found in the urine of 10 of the 12 chronic fecal typhoid carriers more than 4 months after the first symptoms of typhoid fever.

There were 51 individuals, including 29 males, whose stools contained typhoid bacilli and then became negative. The median number of days after the onset of illness that *B. typhosus* was last present was 44, and first absent for two or more consecutive specimens 51 days. There was no significant sex difference.

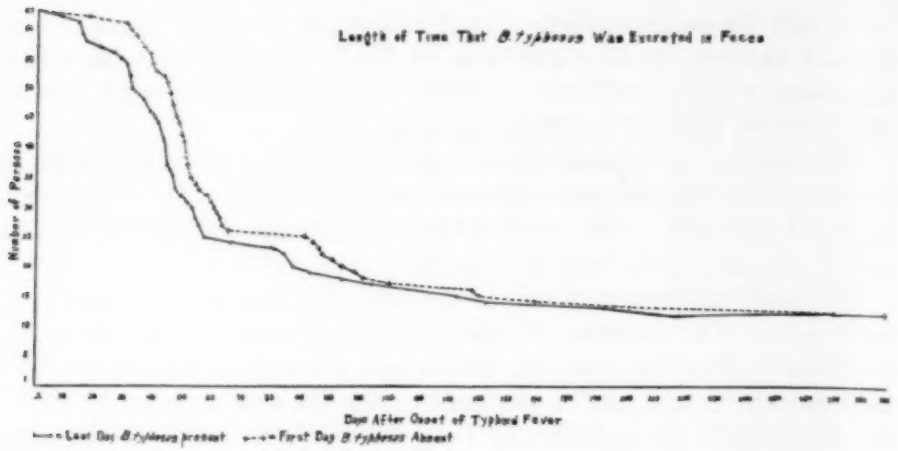
There were 43 persons including 26 males whose urine contained typhoid bacilli and then became negative. The median number of days after the first symptoms of typhoid fever that *B. typhosus* was last present was 50, and first absent on two or more successive occasions was 57 days. The median figures for the males were almost the same as those for the females.

LENGTH OF TIME THAT B. TYPHOSUS WAS EXCRETED IN FECES

The graph (Figure IV) depicts the length of time after the first symptoms of typhoid fever that *B. typhosus* was excreted in the feces of 63 persons, including the 12 chronic typhoid carriers.

The graph (Figure V) depicts the length of time after the first

FIGURE IV


Length of Time That B. typhosus Was Excreted in Feces
Number of Persons
Days After Onset of Typhoid Fever
Last Day B. typhosus present
First Day B. typhosus Absent

symptoms of typhoid fever that *B. typhosus* was excreted in the urine of 53 persons, including 10 chronic urinary carriers.

Typhoid bacilli have been found in fecal specimens from the 12 chronic typhoid carriers in the last specimens examined from 495 to 652 days after the onset of illness. The bacilli have been found in the urine of 10 of the above carriers from 121 to 630 days after the first symptoms of typhoid fever.

FIGURE V

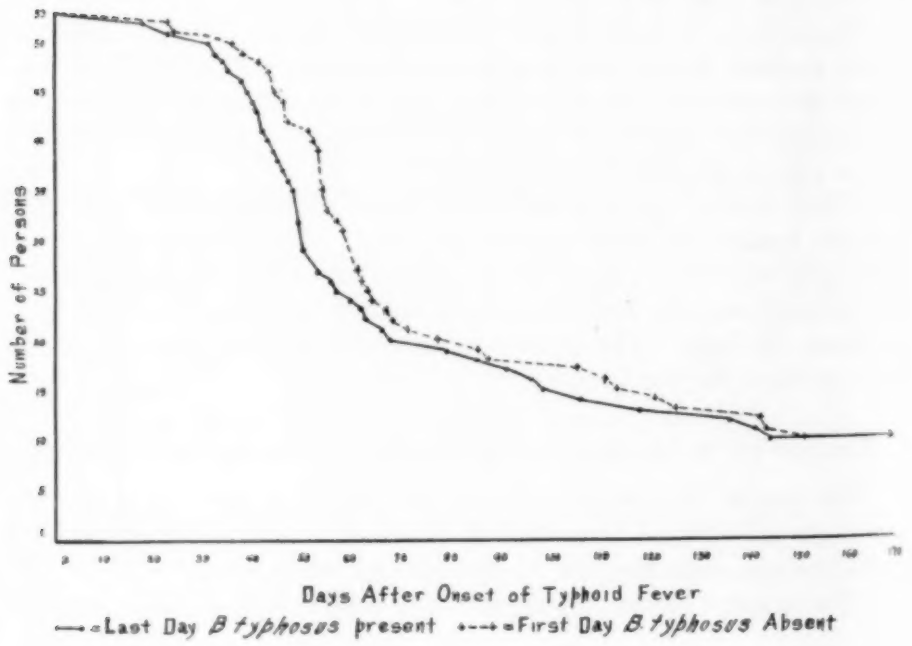

Length of Time That B. typhosus Was Excreted in Urine
Number of Persons
Days After Onset of Typhoid Fever
Last Day B. typhosus present
First Day B. typhosus Absent

TABLE VIII

LENGTH OF TIME *B. typhosus* WAS EXCRETED BY 12 CHRONIC TYPHOID CARRIERS REMAINING FROM OLEAN EPIDEMIC

Specimen	Number of Persons	Days After Onset of Typhoid					
		Mean		Median		Range	
		B. typhosus		*B. typhosus*		*B. typhosus*	
		First Found	Latest Found	First Found	Latest Found	First Found	Latest Found
Feces	12	46	593	48	627	12–79	495–652
Urine	10	73	386	70	373	12–169	121–630

The 12 chronic typhoid carriers included 9 married women and 3 married men or three times as many females as males. All the women except one had borne children and that one had symptoms of acute cholecystitis during her illness with typhoid fever. The mean age of the 12 was 44 years, and the range of ages was 27 to 61 years.

Ninety-seven per cent of 391 fecal specimens from the 12 chronic typhoid carriers for a period of at least 16 months after the onset of illness have contained typhoid bacilli.

Urine specimens from 1 male and 1 female typhoid carrier have never contained *B. typhosus*. Thirty-two per cent of 253 urine specimens from the remaining 10 typhoid carriers have shown typhoid bacilli. Some of the urine specimens may have been contaminated by feces. *B. typhosus* was excreted in the urine of the carriers much more intermittently than in the feces.

One of the chronic typhoid carriers who had onset of mild typhoid fever September 28, 1928—diagnosed 2 months later—was probably responsible for 3 cases of typhoid, including 1 death, prior to her dis-

TABLE IX

AGE AND SEX OF 12 OLEAN CHRONIC TYPHOID CARRIERS

Age by Year Groups	Total	Male	Female
All Ages	12	3	9
25–34	3	0	3
35–44	3	2	1
45–54	4	1	3
55–64	2	0	2
Mean Age	44	45	44
Median Age	45	44	46
Range of Ages	27–61	37–54	27–61

covery and for 2 cases subsequently. (She is one of the 2 carriers who excreted typhoid bacilli in the feces but not in the urine.) Another of the chronic carriers is believed to have given rise to 3 cases of typhoid, including 1 death.

TYPHOID VACCINATION

At city health department and school clinics during the course of the typhoid epidemic 3,990 persons received three inoculations with New York State Department of Health typhoid vaccine, or in a small proportion of cases the mixture of typhoid and paratyphoid A and B vaccine. Physicians in their private practice immunized 671 school children and many other persons.

TABLE X

TYPHOID IMMUNIZATION OF OLEAN SCHOOL CHILDREN

Age in Years	Pupils Number	Pupils Immunized		Days of School Attendance Lost				
		Number	Per cent	Inoc. No. 1	Inoc. No. 2	Inoc. No. 3	Total	
							Number	Per 100 Pupils Immunized
4	131	32	24	2.0	1.0	2.0	5.0	15.6
5–9	2,213	1,184	54	123.0	108.5	89.0	320.5	27.0
10–14	2,219	1,419	64	117.0	183.0	116.0	416.0	29.3
15 & over	781	516	66	51.0	73.5	65.0	189.5	36.7
Total	5,344	3,151	59	293.0	366.0	272.0	931.0	29.5
Total per 100 Pupils Immunized				9.3	11.6	8.6	29.5	

Table XI shows the effects of the typhoid immunization of 3,151, or 59 per cent of the Olean school children. The days of attendance lost, per 100 pupils immunized, was 9.3 for the first inoculation, 11.6 for the second, and 8.6 for the third, or a total of 29.5 days. For the three inoculations together the days of school attendance missed per 100 students treated increased from 15.6 at age 4 years to 36.7 at age 15 years and over.

The days of illness due to all three inoculations per 100 pupils immunized was 32.5 of which 13.4 days were due to sore arms, 9.9 to headaches, 8.1 to general reactions, 0.8 to dizziness and 0.3 days to miscellaneous causes. The totals increased from 18.7 days per 100 pupils protected at age 4, to 44.1 days at age 15 years and over. Skin eruptions were noted for 3.1 per cent of the students.

Among the 248 typhoid patients there were 24 who had received

TABLE XI

TYPHOID IMMUNIZATION OF OLEAN SCHOOL CHILDREN

Age in Years	Pupils Immunized	Days of Illness Due to Inoculations							Skin Eruptions	
		General Reactions	Sore Arm	Headache	Dizziness	Misc.	Total		Number Pupils	Per cent. of Pupils Immunized
							No.	Per 100 Pupils Immunized		
4.....	32	1	4	1	0	0	6	18.7	0	0
5-9.....	1,184	91	138	78	9	5	321	27.1	53	4.4
10-14....	1,419	129	177	146	15	4	471	33.1	43	3.0
15 & over.	516	36	105	86	1	0	228	44.1	4	0.7
Total....	3,151	257	424	311	25	9	1,026	32.5	100	3.1
Total per 100 Pupils Immunized		8.1	13.4	9.9	0.8	0.3	32.5			

from one to three inoculations with typhoid vaccine during the progress of the epidemic, and 9 who had obtained three injections from 3 to 11 years previously. The latter number included 2 registered nurses and 5 ex-military men of whom 3 were World War soldiers. The number of cases of typhoid fever among the estimated 1,000 World War veterans in Olean was about one-quarter that per 1,000 males of their age group who were not in that war.

COST OF OLEAN TYPHOID EPIDEMIC

The State Legislature has authorized the City of Olean to issue 25-year bonds to the amount of $425,000 to pay the cost of the care of the Olean typhoid cases and to settle claims. A committee of seven appointed by the Olean City Council had by September 10, 1930, spent approximately $370,000 and had about 24 unsettled claims, including those for 1 death and for 5 chronic typhoid carriers, of whom 1 typhoid carrier demands $75,000. The claims committee has in general allowed all bills for physicians, nurses, hospital expenses, and loss of time of wage earners, and made settlements for deaths in proportion to the number of dependents and the earning capacity of the individual before he had typhoid fever.

If the remaining $55,000 of the authorized bond issues will satisfy the outstanding claims, the average cost per person who had typhoid fever and lived will be about $1,550. The range has been from nothing to $16,556 for a railroad conductor age 49 years who became incapacitated as the result of the complications of typhoid fever. The

average for expenses and settlement per death is about $3,200, ranging from $714 for nursing and hospital expenses in the case of a 72-year-old physician to $11,550 for the death of a 56-year-old railroad crew dispatcher who left a family. The $425,000 would thus be divided into $345,000 for the living and $80,000 for the expenses and claims of heirs of the dead.

The payments have by no means completely compensated the typhoid patients and their families for economic losses sustained. It would be difficult to recompense fully the 12 persons who became chronic typhoid carriers. The state, county, and city health departments, the Red Cross, and other organizations had their expenses increased by the Olean epidemic.

The secretary of the Olean Chamber of Commerce estimates conservatively that the direct loss to Olean business because of the typhoid epidemic was $200,000. The wholesale bakeries which supplied the surrounding area and the other establishments including hotels, which catered to out-of-town trade, were particularly hard hit by loss in patronage.

The enlargement and improvement of the Olean water filtration and chlorination plant since the typhoid epidemic have cost approximately $125,000, making the total value of the plant now about $250,000. Plans are being prepared for an improved sewerage system and a sewage disposal plant.

ACKNOWLEDGMENT

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Camp Hygiene and Sanitation

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THE present paper is supplementary to the studies embodied in a plan for the hygienic and sanitary classification of summer camps published in 1929.[1] In order to secure accurate data contacts were made with all but 3 State Departments of Health, the U. S. Army, the U. S. Public Health Service, executive departments of the large camp organizations (Boy Scouts, Girl Scouts, Y. M. C. A., Y. W. C. A., Camp Fire Girls, Catholic Summer Camps), the National Safety Council, and certain private camp groups. These lay organizations have devoted much time and effort to the study of various phases of camp life. The tourist camp will be briefly considered as a closely related problem.

The possibilities involved in the maintenance of proper sanitary facilities in camps may be surmised from the following figures. According to the 1929 *Handbook of Summer Camps*[2] there were 2,737 camps distributed through 35 states. Of these, the most densely populated were: New York (394), Maine (230), Pennsylvania (205), New Hampshire (185), Massachusetts (180), California (150), Michigan (116), Illinois (105), Ohio (103), and Connecticut (97). The greatest concentrations are seen about the lake shores of Maine and central New Hampshire, and the hills and valleys of the White, Green and Adirondack mountains. Of 2,776 camps, including 39 in Canada, approximately half (1,346) are private while the remainder are distributed as follows:

Organization	No. of Camps	Population
Boy Scouts	498	300,000
Girl Scouts[3]	323	41,472
Y. M. C. A.[4]	415	101,165
Camp Fire Girls[5]	101	57,182
Other organizations	90	Not known

These figures do not include the 200 camps operated by the Y. W. C. A.[6] at which the 1929 attendance totaled 103,000. It will therefore be seen that the 5 major camp organizations alone controlled a 1929 summer population of 602,819 persons.

The tourist camp problem is intimately bound up with improved road conditions and opening of the national park areas. The latter

approximate 11,304 square miles according to the latest available figures. In 1922 approximately 13 million automobiles were owned by the people of the United States and 2,819,386 miles of highways were certified by the U. S. Bureau of Public Roads as being available for use. Solomon[1] estimates the present number of motor tourist camps at 15,000 with a transient population of 3,150,000, including 1 million juniors.

The most complete studies of tourist camps have been made in Minnesota, Florida and West Virginia. In Minnesota there are 175 camps, 160 of which are owned, loaned or rented by the city or village. During 1926 the West Virginia Department of Health made complete inspections of 110 water supplies and certified only 11 as safe. "Safe Water" markers are now posted along state and federal highways in West Virginia, Ohio, Pennsylvania, Michigan, Missouri and Florida. There are no general statistics available relative to disease incidence in summer camps.[2] The problem as it concerns the public health worker may be divided into food and insect-borne infections, contagious disease and preventable accidents. Only the first will be considered because of its relative importance. The diseases are chiefly typhoid, paratyphoid and dysentery, with typhoid predominating. I have also encountered outbreaks of gastroenteritis apparently due to some member of the salmonella group and associated with faulty sanitation. The clinical manifestations are much like those of bacillary dysentery. The difficulties encountered in tracing some of these outbreaks may perhaps be exemplified by one instance in which infective material seeped through a small break in an old sewer line into the water supply. Large quantities of methylene blue and chromogenic bacterial suspensions failed to come through. It was finally found necessary to excavate the entire system in order definitely to ascertain the source of contamination.

As the typhoid problem, from a public health standpoint, applies to other intestinal infections it alone will be considered. Typhoid fever outbreaks in summer camps are generally secondary to:

1. *Sanitary Facilities*—Poor sanitary facilities whereby typhoid excreta from in or outside the camp reach a water supply not filtered or chlorinated. This is essentially the problem of the sanitary engineer. The drinking water supply and sewage disposal system are the most important factors in the consideration of any camp site. Without their careful planning and supervision infections of intestinal origin will sooner or later manifest themselves. Casual or periodic water examinations for *B. coli* may do much harm by lending a false sense of security to otherwise solicitous camp directors. The possibility of se-

curing suitable connections with the nearest town having a carefully supervised water supply and sewage disposal system should be considered in the choice of a camp site. In lieu of this, the use of properly constructed septic tanks with after-treatment of the effluent (chlorination or sub-surface irrigation) and of filtered or chlorinated drinking water is always advisable. The use of water from open lakes without further treatment is never devoid of danger. Hikers should carry their drinking water from camp or else boil or chlorinate it en route. Disposal of excreta by burial away from a water supply is largely a matter of education by the camp sanitarian and effectual supervision by the councillor in charge.

2. *Carriers*—The carrier problem is becoming more apparent as the various state departments of health enforce the requirement of negative fecal cultures before the final discharge of a typhoid patient. The number of known carriers will undoubtedly increase. Late in 1929 the New York State Public Health Council amended Chapter 2 of the Sanitary Code providing for such cultural examinations, a procedure which had been in force in New York City for some time. It is quite generally conceded that approximately 5 per cent of all typhoid patients remain carriers for varying periods. The State Health Department records show that many were responsible for cases within 12 months after recovery from the disease. Recently the Health Commissioner of New York City claimed that 40 per cent of the serious outbreaks could be traced to carriers. At the end of 1930 this city carried a list of 301 carriers. At the end of 1927 there were 188 known carriers in New York State exclusive of the city.[9]

As a result of improved epidemiological work 41 additional carriers were discovered in up-state New York during 1929, exceeding by nearly 50 per cent the figures of any previous year.[10] By the end of 1930 the total number had increased to 268, making a total of 569[11] for the entire state.

A recent example of the carrier problem is the outbreak which occurred during the summer of 1929 in a Pennsylvania camp, involving 61 people with a mortality of 6 per cent. I had an opportunity of culturing the feces of one of these patients in April, 1930, 7 months after recovery, and found typhoid bacilli, a result previously obtained by the New York City Department of Health. That typhoid has diminished somewhat, but still constitutes a formidable problem, may be seen from the following figures. Typhoid fever cases reported to the U. S. Public Health Service, July to September, inclusive,[12] were: 1928, 12,161; 1929, 10,110; 1930, 11,614.

In an attempt to clarify existing legislative enactments regarding the conduct and supervision of summer camps, inquiries were sent to

the health department of every state. Of 45 from which the required data were received 8 (Georgia, Alabama, Vermont, Iowa, Louisiana, North Dakota, Wyoming, New Mexico) had no regulations specifically governing summer camps. The more complete and stringent regulations were found to exist in the Eastern and New England states where summer camps abound. In most states the general sanitary code would, in a sense, apply to summer camps which might come under the supervision of a local health officer. In actual practice, however, it has been found most feasible to enact specific public health measures. The more detailed provisions for camp surveillance exist in Colorado, Florida (tourist camps), Kentucky, Maine, Massachusetts, Minnesota (tourist camps), Missouri, New Hampshire, New Jersey, New York, North Carolina, North Dakota (tourist camps), Ohio, Oklahoma, Oregon (tourist camps), Rhode Island and Virginia. Vermont has no printed rules and relies entirely upon personal visitation by the sanitary engineer.

Special licensing is necessary in New Hampshire, Illinois, Idaho, Maryland, Nebraska, New York, Ohio and North Dakota. An inspection and rating system is in force in Kansas, Illinois, Maine, New York, North Carolina, Oregon and Michigan. Official State Health Department approval by signs or published lists may be obtained in Colorado, Florida, Kentucky, Michigan, Missouri, Ohio, Oklahoma, Texas and West Virginia.

In general, it may be stated that existing regulations may be divided into those which are:

1. Loosely enforced (advisory)
2. Strictly enforced (compulsory)
    a. Voluntary regulation by lay organizations
    b. Enforcement by the State Department of Health

In the first group the provisions of the general sanitary code are rather loosely applied to camps because of their short period of existence each year and the desire to avoid loading them with any great financial burden. The compulsory or strict enforcement group regards camps as communities requiring the same strict sanitary supervision as permanent towns or cities in spite of their short lived existence. Compulsory regulations, however, do not necessarily emanate from state departments of health. Many of the large camp organizations and certain private owners have voluntarily set up regulations which not infrequently, in certain states, exceed the requirements of the local or state health departments. Moreover, these bodies are not so unwieldy and slow to convince as local legislatures. Sanitary problems

are more apt to be quickly recognized and solved. An example may be found in Massachusetts where "surveys of camps and records of contagious disease outbreaks have shown that many camps fall short of reasonable health standards."

In order to secure such standards The State Department of Public Health recently asked for a camp licensing law, which, after being proposed, failed to pass. The large camp organizations, on the other hand, seem to have taken the initiative, having accumulated a voluminous literature and issued such publications as *Camping* (Playground Recreation Association of America). The National Safety Council has also collected an extensive bibliography on "Camp Safety Hygiene and Sanitation" and has issued accident and illness follow-up cards in an endeavor to secure data of value in preventive work. The Y. M. C. A. and others are making similar studies.

REASONS FOR THE PRESENT INADEQUATE SUPERVISION OF SUMMER CAMPS

A critical study of existing regulations as promulgated by the various state departments of health suggests the following reasons for the present unsatisfactory state of summer camp supervision:

1. While there is a general recognition of widely accepted public health measures there is some divergence of opinion as to their radical enforcement in the case of summer camps.

2. Efficient and capable state departments of health are frequently hampered by lack of funds. Preventive public health work rarely receives the same monetary support as emergency epidemiological investigations, though the latter are largely the result of the inadequacy of the former. The per capita assessment to cover a state health department budget does not generally take into account the great influx of campers from other states. Young public health recruits are discouraged by the relatively poor compensation for their services.

3. The good work of a health department in one state may be seriously hampered or nullified by the laxity of a similar body in a neighboring state.

4. The lack of accurate data with regard to disease incidence in summer camps.

5. Public health regulations have been outstripped by the rapid growth of the camp movement, shown by the incomplete figures of the Y. M. C. A.:

Year	No. of Camps	Attendance
1900	20	Not known
1926	421	32,213
1929	—	101,165

6. Commercial and political impediments. The desirability of having large camp groups in certain states has not infrequently involved the letting down of customary public health barriers.

SUGGESTIONS FOR ELEVATING CAMP STANDARDS

1. The creation of a central advisory board consisting of a representative each

of the U. S. Public Health Service, U. S. Army, state departments of health, large organized camp groups and private groups. The function of this board would be to collect accurate epidemiological data (e.g., known typhoid carriers), to draw up uniform hygienic and sanitary standards and stress the approval of camps meeting these standards.

2. The more rigid enforcement of existing sanitary regulations by state departments of health.

3. The attitude of state departments of health toward existing camps to be advisory and constructive but without compromise as to accepted sanitary standards.

4. Adequate budget for state departments of health in order to enable these bodies to augment their forces for summer camp work. Personnel may consist of undergraduate public health workers under the supervision of competent, experienced directors. Employment of qualified public health nurses and other professionally trained persons whose occupations permit their accepting summer positions.

5. A resident graduate medical attendant trained in the principles of public health work in or near each camp.

6. Educational campaign among children and adults for 1 month preceding the summer vacation period. Wide dissemination of knowledge concerning summer typhoid and other communicable diseases as well as preventable accidents, through teachers, schools, camp organizations, health department bulletins and lay periodicals.

7. Placarding of all safe drinking and bathing waters, roadside eating places in summer camps and along the main highways.

8. Local purchases of camp food from approved sources.

9. Enforcement of two negative fecal cultures, one urine culture and a Widal for every food handler.

10. Stressing of typhoid prevention work as much as vaccination against smallpox. (I have had several opportunities to note the occurrence of typhoid in recently vaccinated boys who, feeling secure, drank water promiscuously on their daily hikes.)

11. Accurate records, in duplicate, containing the names and addresses of all campers and visitors in order to trace contacts.

12. Minimal toilet seat capacity of one toilet seat per 15 people. The lack of suitable toilet facilities is a rather common cause for the indiscriminate soiling of camp grounds, with its inherent dangers. The laxity in this regard may be illustrated by the requirements of certain states:

State	One seat per
Maine	15 persons or fraction
Connecticut	15 " " "
Massachusetts	15 " " "
Oregon	25 " " "
Washington	50 " " "
Oklahoma	15 " " "

13. The annual certification and licensing of camps, with revocation at any time for cause.

14. Weekly unannounced inspections with prompt closing after suitable warning of camps falling below accepted standards rather than the repeated publication of approved camp lists or more stringent legislation.

15. Centralization of camp approval in state departments of health rather than by local health officers except where experience and laboratory facilities are adequate.

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ADDENDUM

Figures received since this article went to press are as follows:

In 1930 the Girl Scout Camps numbered 544 with a population of 48,077 (Johnson, K. L.); Boy Scout Council Camps numbered 614, which, in conjunction with miscellaneous camps, controlled a population of 320,000 (Wessel, W. C.).

In February, 1931, the National Park areas comprised 16,263 square miles, including 3,741 square miles of National Monuments (Demara, A. E.). In 1929 there were 23,121,589 passenger automobiles registered in the United States and 3,024,233 miles of road available for use, including 314,136 miles of state highways (Fairbank, H. S.).

The Inner Reservoir

"THE ability to make the best use of leisure," said Dr. Kenworthy, who is one of the country's leading woman psychiatrists, " is a good test of a person's adjustment to life. Many individuals find satisfaction in their work, but in their moments of leisure they become restless and uneasy because they have no interests to turn to that will provide the same fundamental release which they derive from their work.

" They are unable to live with themselves, as it were, too fearful to be alone with their own thoughts and, oppressed by a sense of emptiness, they turn to others for relief. They are unable to use their free time as an opportunity for creative self-expression, but only to satisfy a demand for security that is not available within themselves. Their pleasures are therefore mere ways of escape to which they are forced by the lack of adequate personal integration and of the necessary inner adaptation."—Marion E. Kenworthy, Speech, January 14, 1931, before American Woman's Association, *Mental Hygiene Bull.*, Jan.–Feb., 1931.

EDITORIAL SECTION

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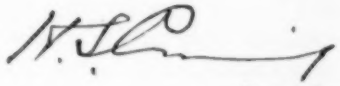
TO THE MEMBERS OF THE AMERICAN PUBLIC HEALTH ASSOCIATION:

IT is my pleasure to report to you what I consider the most important event that has transpired in the American Public Health Association in recent years.

I refer to the appointment by the Executive Board of Dr. Kendall Emerson as Acting Executive Secretary. Those of us who have been close to the affairs of the Association count ourselves fortunate that we have been able to obtain the service of a man who has behind him such a brilliant administrative record to manage the business of the Association.

A full account of Dr. Emerson's achievements is recorded in the accompanying editorial. To many of the members of the American Public Health Association he needs no introduction. They already count him a friend. Those who do not know him will hold him in as high esteem, as they encounter his personality, his ideas and his ideals.

Dr. Emerson brings a wealth of seasoned judgment and experience to the problems of the Association. I believe, as does every member of the Executive Board, that he is eminently fitted to carry its best traditions to a new and high goal.



President

DR. KENDALL EMERSON APPOINTED ACTING EXECUTIVE SECRETARY OF THE A. P. H. A.

THE National Health Council, an affiliation of national health agencies, at the request of the Executive Board of the American Public Health Association, has arranged with the National Tuberculosis Association to make available a part of the time of its Managing Director, Kendall Emerson, M.D., to serve as Acting Executive Secretary of the American Public Health Association.

KENDALL EMERSON, M.D.

It is believed by the groups concerned that this is a valuable experiment in economy of administrative operation of two national health organizations.

While the plan is of a temporary nature, marked sympathy and interest have been expressed by public health leaders in these organizations, whose aims and objectives are so closely related. The plan contemplates the continuance of full independence and autonomy of each association.

Dr. Emerson was graduated from Harvard University Medical School in 1901, and served his internship at the Massachusetts General Hospital. He later engaged in general practice in Worcester, Mass., and in 1903 became a member of the staff of the Memorial Hospital there, as chief of the Surgical Service. He is a member of the American College of Surgeons.

In 1916 Dr. Emerson went to France as a major in the Royal Army Medical Corps. He served later in the American Army, and after the Armistice became attached to the American Red Cross, serving in Siberia and later in Washington. From 1919 to 1921 in Paris he was Deputy Commissioner and Director of the Medical Service for Europe during the commissionership of Robert E. Olds.

In 1926 he was elected president of the Massachusetts Tuberculosis League and a director of the National Tuberculosis Association. He was elected Managing Director of the National Tuberculosis Association, in New York, in 1928.

Dr. Emerson's services with the American Public Health Association begin April 1.

STUDENT HEALTH

AT the last meeting of the American Student Health Association held in New York, December 29 and 30, 1930, a set of resolutions covering the whole field of college hygiene and student health was adopted. These resolutions grew out of the desire of the President, Dr. Warren Forsythe, to crystallize out of the association's experience that which could be considered of proven value in college hygiene teaching and student health service practice.

The document proposes in the first place that it is a fundamental objective of higher education to develop the ability of the individual to live a more useful, effective and happy life, and since health (emotional and physical) is one of the greatest factors in the realization of this objective it is a major responsibility of every college and university to carry on a program which will develop and protect the health of the student and educate him in scientific health conservation.

The program is divided into:

1. Instruction in and development of physical and mental health
2. The supervision of the care of individual student health and illness
3. The sanitation of student environment
4. The study of health problems

In the first division of the program it is resolved that instruction should aim to analyze and present scientific information relative to the production, maintenance and improvement of health, with the applications of that information for the health benefit of the individual, his family, and of his society. Further this instruction should aim at developing in the student a discriminating scientific attitude for: (1) the selection and wise use of competent, trustworthy health advisers and skillful, dependable health service; (2) the sifting of health literature, avoiding the hazardous and identifying the scientific and appropriate; (3) differentiating between reliable scientific public health organizations and those that are unsafe; (4) the understanding and regulation of his own health habits. It is further recommended that the teaching of hygiene be under the direction of qualified members of the faculty adequately trained in medicine and public health, and that students receive academic credit for these courses on the same basis as in other curricular subjects.

The native health material occurring in chemistry, psychology, biology and other similar courses should be utilized and emphasized in its appropriate setting. Supervision of the care of student health and illness should be in the hands of a physician who is a full graduate in

medicine and properly licensed to practise in his community. He should also be included in the general faculty administrative agency of the college or university.

There should be complete examinations of all entering students followed by personal health conferences of an educational character and a special endeavor should be made to have all remedial defects corrected. The annual health examination of all students is advised, in which emphasis is placed upon confidential discussion of personal health and emotional problems. Evidence of immunity to smallpox should be one of the requirements for admission and no student should be permitted to remain in school who proves to be a health menace to other students or who refuses to coöperate in the health program of the institution.

It is further resolved that the college should conduct a student clinic for the diagnosis and treatment of all ambulatory cases and provide for hospitalization of all cases which need that service. This service should be supported by health fees payable at annual enrollment and individual visits should not involve the payment of a fee. Each visit to the student clinic should be considered as a lesson in proper methods of procedure in scientific medical practice, and as an opportunity for personal instruction in preventive medicine including mental hygiene. When possible a physician with mental hygiene training or a psychiatrist should be attached to the Health Service staff.

Isolation facilities should be available for all contagious diseases and early isolation of merely suspicious cases should be freely practised. Communicable diseases should be controlled through careful observation of all known contacts, and artificial immunization used when possible. Much of the future progress in preventive medicine lies in the results of the study of so-called pre-clinical illness and the health service should keep clearly in mind its unique opportunity and its responsibility for research in this field. The health service should supervise the sanitary inspection of the premises, buildings, swimming pools, water and milk, and food supplies. All food handlers should be required to submit to annual physical examination. Dietary policies of institution should receive the attention of the health service.

In view of the fact that at the present time several agencies such as department of hygiene, department of physical education, student health service, athletics, etc., each asserts itself as being importantly interested in the health of the college student, it is resolved that there be conducted a careful study of what should be termed specific health activities.

The last resolution calls upon college presidents in rural communities to promote and coöperate with the county health unit under the direction of a full-time medical officer as the most effective method of advancing public health practice in their communities.

The committee consisted of the following: Dr. Anna M. Gove, North Carolina College for Women; Dr. Joseph E. Raycroft, Princeton University; Dr. Dean F. Smiley, Cornell University; Dr. T. A. Storey, Stanford University; Dr. John Sundwall, University of Michigan; and Dr. R. W. Bradshaw, Oberlin College, *Chairman*.

ROCKY MOUNTAIN SPOTTED FEVER DISCOVERED IN EASTERN STATES

ROCKY MOUNTAIN spotted fever has been discovered in the East, it was announced February 27 by the U. S. Public Health Service.

A number of cases of this highly fatal disease have been found in Virginia, Maryland, Delaware, North Carolina and Pennsylvania. At first these were thought to be severe cases of endemic typhus fever but after much experimentation by scientists of the National Institute of Health, they were identified as a disease "clinically indistinguishable from Rocky Mountain spotted fever."

An indication of the possibility of Rocky Mountain spotted fever spreading from its locale and invading other parts of the country was expressed last December in the 1930 annual report of the Service in which it was declared that the disease can be spread not only by specific ticks in the Northwest but also by a certain type of tick which infests dogs, cattle, and a number of rodents which are common throughout the entire country.

Rocky Mountain spotted fever is a very virulent disease, the Service explained, since 60 to 80 per cent of those attacked usually die.

Sixtieth Annual Meeting

Montreal, September 14--17

HEADQUARTERS, WINDSOR HOTEL

ASSOCIATION NEWS

Dr. Samuel H. Durgin

1839–1931

DR. SAMUEL H. DURGIN, former chairman of the Boston Board of Health and a surgeon with the Massachusetts cavalry in the Civil War, died at his home in Allston, Mass., on March 6.

Born in Parsonfield, Me., July 26, 1839, he attended Dartmouth College and the Harvard Medical School. Graduating from the latter in 1864 he saw service as an assistant surgeon at Richmond and Petersburg and was present on the field when Lee surrendered.

When he returned to Boston in 1865, he entered into the practice of medicine. In February, 1867, he was appointed Resident Physician for the City Institutions situated in the Harbor and was also made Port Physician. In January, 1873, he resigned this position, having been elected a member of the newly formed Board of Health for the City of Boston and soon after was made Chairman, serving as such until he was retired in 1912.

At the time the Board of Health was established, metropolitan Boston had no drainage system and for years Dr. Durgin fought against determined opposition for the establishment of adequate sewage disposal. He finally won this cause and as a result the metropolitan area of Boston was given what was at that time the most up-to-date sewage disposal system in the country.

Soon after the discovery of diphtheria antitoxin by von Behring in 1894, a plant for its manufacture was started by Dr. Durgin at the quarantine station on Gallup's Island with Dr. Harold C. Ernst, Professor of Bacteriology at Harvard Medical School, as the director. This was continued until the serum was available from other sources.

Samuel H. Durgin, M.D.

Dr. Durgin was one of the first in the country to inaugurate the requirement of two consecutive negative cultures for release of a case of diphtheria, the second culture taken at least 24 hours after the first and by a medical representative of the department. Dr. Durgin was the inventor of the wooden tongue depressor now so widely used throughout the civilized world.

From 1884 to 1909 he was a lecturer on hygiene in the Harvard Medical

School. He was trustee of the Floating Hospital for many years and was actively interested in its work. Dr. Durgin was president of the American Public Health Association in 1893. He became a member of the Association in 1875, was made an honorary member in 1916, and an Honorary Fellow in 1922. He was the oldest member of the Association.

NEW FIELD DIRECTOR OF THE COMMITTEE ON ADMINISTRATIVE PRACTICE

CARL E. BUCK, Dr.P.H., formerly Deputy Commissioner, Executive Officer, and Secretary, of the Detroit Department of Health, has been appointed Field Director of the Committee on Administrative Practice of the American Public Health Association. He succeeds W. F. Walker, Dr.P.H., who resigned, as of April 1, to go with the Commonwealth Fund as Director of the Division of Public Health Studies. Dr. Walker has been with the Association since 1925.

Dr. Buck was a member of the American Sanitary Commission to the Balkan States in 1915 during the typhus fever outbreak in Serbia. He was Health Commissioner of Oak Park, Ill., 1916–1917. He served in the Air Service of the U. S. Army during the World War. After the war he was a member of the staff of the International Health Board of the Rockefeller Foundation, doing malaria work in the southern states. At the time Dr. Kiefer was made State Health Officer of Michigan Dr. Buck was loaned by the Detroit Department to the State Department as administrative assistant. He was president of the Michigan Public Health Association, an affiliation of the A. P. H. A., in 1929.

Dr. Buck's work with the A. P. H. A. begins April 1.

WESTERN BRANCH, AMERICAN PUBLIC HEALTH ASSOCIATION

THE Seattle meeting will be May 28–30. An excellent program is being planned. Medical economics in relation to public health will receive a prominent place on the program. Infantile paralysis, which may be expected in the Pacific Coast and intermountain states this coming summer, will receive considerable attention. California's experience with the extensive use of convalescent serum will be described.

Public health education from the standpoint of the general public, public health nurse, medical social worker, and the medical student, will be one of the leading symposiums.

Public health nursing will be given a prominent place under the leadership of Elnora Thomson and Elizabeth Soule, both of the Pacific Northwest. Sanitary engineering, food control, and sanitary inspection will all have places on the program.

DEATH OF THOMAS F. KENNEY

THOMAS F. KENNEY, M.D., Director of Public Health in Worcester, Mass., since 1919, died March 15 at the Peter Brigham Hospital, Boston. Dr. Kenney was recognized throughout the country as a leader in the field of public health. For several years he has given a special lecture course in health subjects at the Massachusetts Institute of Technology. He was the Health Officers Section representative on the Committee on Training and Personnel of the A. P. H. A. He has been a member since 1918, and a Fellow since 1922.

ON April 6, the American Public Health Association, with other members of the National Health Council, will move its executive offices to 450 Seventh Avenue.

PUBLIC HEALTH ADMINISTRATION

HENRY F. VAUGHAN, D. P. H.

Survey of Use of Preventive Medical Services for Preschool Children—The study pertains wholly to preschool children, those under 6 years of age, and involves 140,000 children in 146 cities and 37,000 in the rural sections of 42 states. Information was sought with regard to the application of four preventive measures: (1) Health Examination, (2) Dental Health Examination, (3) Vaccination against Smallpox, (4) Immunization against Diphtheria.

The survey information was collected by local health workers who followed a prescribed method of questioning parents, and the results are comparable just in so far as such instructions were followed. The health examination meant a visit to a doctor to see how the child was getting along even though he were not sick. In like fashion the dental examination meant a visit to the dentist not because of a toothache but just to have the teeth looked over with a view to preventing trouble.

Districts to be surveyed in the cities were chosen around the public schools as a center with the view of securing a cross-section of the various economic groups in the population, there being established for this purpose five such groups. The selections were made by the committee so as to give a very fair cross-section of the population. The rural data were obtained from families living in the open country or from communities under 2,500 population.

How many children under 6 years of age have had a health examination? The leading cities are: Berkeley, Calif., with 82 per cent; Providence, R. I., 76; Lakewood, O., 75; Utica, N. Y., 73; Cleveland Heights, O., 72. For the average United States city 48 per cent of the preschool children have had a health examination.

At what age are the health examinations given? Compilation of statistics from cities indicates that for infants under 1 year of age, 57 per cent have been examined; for the 1-year group, 54; for the 2-year olds, 50; for the 3d year, 48; 4th year, 48; and 5th year, 52. The inference to be drawn from these figures is that there are practically no health examinations after the 1st year. The figure of 52 in the 5th year means that 52 per cent of the children 5 years of age, some time in their lives, have had a health examination. This does not mean just during the 5th year, but at any time up to and including the 5th year.

Although the difference is not great, the highest economic group in the community has been better served, the lowest having received the poorest service, only 43 per cent having been examined in comparison with 62 per cent for the highest economic group.

In the average United States city, 10 per cent of the preschool children have had a dental health examination. The leading cities were: Cleveland Heights, O., 46 per cent; Newton, Mass., 42; Kansas City, Mo., 34; Berkeley, Calif., 33; Salt Lake City, Utah, 29. Among the relatively well-to-do, about 1 child in 5 has had a dental health examination while in the poorest economic group only 1 in 25 has had such examination. In general, it may be said that dental attention is not commonly sought and

there is apparently little of this work being done for the poorer children.

For the average American city, 14 per cent of the preschool children have been vaccinated against smallpox. In New York City there have been vaccinated 48 per cent; Yonkers, N. Y., 47; Providence, R. I., 40; San Francisco, Calif., 36; and New Haven, Conn., 35.

In the average United States city, 15 per cent of the preschool children have been immunized against diphtheria, the greatest progress at the time of the survey having been made in Niagara Falls, N. Y., with 50 per cent; Syracuse, N. Y., 49; New Haven, Conn., 46; Yonkers, N. Y., 46; and Utica, N. Y., 45. The children of the higher economic groups are receiving the most immunization although the situation varies considerably in individual cities. For example, in Des Moines, Ia., 31 per cent of the highest economic group are protected and only 3 per cent of the lowest, while in Boston, Mass., but 14 per cent of the highest economic group and 29 per cent of the lowest are immunized, indicating, it is believed, that the public clinics are very active in Boston while the private practitioners are doing very little. The contrary is apparently true in Des Moines. Detroit seems to present a picture in which all economic groups are receiving about the same attention. For the highest group, 43 per cent have been immunized; the second, 30 per cent; the third, 42 per cent; the fourth, 37 per cent; while in the fifth or lowest economic group, 42 per cent have been immunized. This is of interest in showing what happens in a city where the health department has given up all free clinics and where all preventive work is done by the general practitioner and the educational program is carried on by the department of health. Among the 36 largest cities, Detroit stands second in percentage of children immunized at the time of the survey, Detroit having 40 per cent and Rochester, N. Y., 43 per cent immunized. In Detroit, all of this work has been done by the coöperating physicians and none by the Health Department, which organization has, of course, carried on the educational and propaganda work.*

In arranging the cities in sequence from the highest percentage to the lowest in each of the four health measures, a composite rating has been obtained which places in the lead Cleveland Heights, O., followed by San Francisco, Calif., Berkeley, Calif., Kansas City, Mo., and East Orange, N. J.—George T. Palmer, presentation before the White House Conference on Child Health and Protection, February 19, 1931.

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* Since this survey was made in September, 1930, the percentage of preschool children immunized in Detroit has been increased to 55.

LABORATORY

JOHN F. NORTON, PH.D.

AN IMPROVED WATER SAMPLE BOTTLE

ROSS L. LAYBOURN, F. A. P. H. A.

State Board of Health Laboratories, Jefferson City, Mo.

THE collection of water specimens for bacteriological analysis by untrained persons is never desirable, yet many situations arise in state work in which, from the standpoint of expediency at least, it seems desirable to accept such specimens. One of the common causes of misleading results under such conditions is the contamination of the stopper of the sample bottle during the collection of the specimen. In an attempt to reduce the possibility of the contamination of bottle stoppers to the minimum, the device shown in the accompanying illustrations was perfected in the Laboratories of the State Board

of Health of Missouri several years ago, and has been found to possess sufficient merit to justify the additional expense involved in its use.

Glass stoppered, metal capped bottles of a type which can be purchased from physicians' supply houses are used. Two holes are drilled in the metal cap in which the ends of a clip of spring

brass wire are inserted. This clip retains the glass stopper well within the metal cap where it is not easily subjected to contamination even if the cap is placed on some object during the collection of the specimen. This arrange-

ment has the additional advantage of making it unnecessary to place a strip of paper between the stopper and the neck of the bottle to avoid breakage during sterilization. In preparing these bottles for sterilization, the caps are simply placed loosely on the neck of the bottle and are screwed down tight after removal from the sterilizer.

The glass used in the standard commercial bottle etches quite rapidly under repeated sterilization and soon presents a very unattractive appearance, and these bottles are also much in demand as replacements in medicine cases. To overcome these disadvantages, a bottle manufacturer is now supplying a bottle of a better grade of glass which withstands repeated sterilization and, as this bottle has the name of the laboratory blown into the glass and does not have the flat side necessary for use in medicine cases, distribution losses are largely eliminated.

VITAL STATISTICS

LOUIS I. DUBLIN, PH. D.

Unsuspected Physical Defects—The Heart Council of Cincinnati has reported the second of a series of studies on the physical status of persons engaged in certain kinds of work. The objective was to determine the extent of diseases of the heart and vascular system. The second report embraces the examination of 1,000 white, male, machine and hand tool operators. The report is mainly a series of tables, from which one is left to draw one's own conclusions.

It was found that 87.1 per cent of the group of 1,000 had been vaccinated in some way; 80.2 per cent of them had been vaccinated against smallpox, 22.5 per cent against typhoid, and 21.9 per cent against diphtheria; only 67 per cent of the workers were considered to be on an adequate diet; 56.3 per cent of them had no illness within the last 10 years.

The cardiovascular lesions noted were indeed numerous. The 45.8 per cent in whom such lesions were found did not include observations of such unproved significance as extrasystoles, trivial hypertrophies and arrhythmias. Those, however, whose lesions were considered significant constituted 31 per cent of the group. The importance of early infections on the heart in later years is shown by the fact that 21.9 per cent of those who had significant heart lesions have a history of illness in the past from some of the common infectious diseases.

A relation between excessive weight and myocardial hypertrophy is indicated by the fact that 49.3 per cent of those who were 20 pounds or more above normal weight had myocardial hypertrophy, while only 5.3 per cent of those who were 20 pounds or more underweight had any cardiac lesion. Of the whole group of 1,000 machine and hand tool operators, 83.6 per cent had significant defects of some kind and 88.5 per cent had defects unknown to them or of which they had not complained.—*J. A. M. A.*, 96: 119–120 (Jan. 10), 1931.

What is a Stillbirth?—An investigation into the many different definitions of stillbirth and into the laws and religious customs attended with the recording of births as live or stillbirths in the different countries and states of the United States indicates that the discrepancies are so great as to render

comparative statistics on stillbirth and infant mortality practically valueless.

In the Province of Quebec (as in some other localities throughout the world) where there is a preponderance of the Roman Catholic faith, there is a tendency, whenever there is a doubt that a new-born child is born alive or not, to report it as a live birth to give the child the benefit of baptism. As a consequence the stillbirth rate in Quebec is lower and the infant mortality rate higher proportionately than in Protestant communities.

In Canada, the age at which a fetus is considered as a live or stillbirth varies: in Manitoba at 5 months; Alberta at 24 weeks; Quebec and Saskatchewan at 6 months; British Columbia at 28 weeks; Prince Edward Island, New Brunswick and Ontario at 7 months. In all the nine provinces there is variance as to what is considered an evidence of life in a new-born fetus or child.

The annual collection of stillbirth statistics in the United States was begun in 1922. The interpretation of these statistics must necessarily be governed by the differing regulations of the states for the period of uterogestation to which a stillborn child must have advanced before a certificate is required to be registered. In 18 states, registration is required after 4 full months, in 2 after 4½, in 3 after 5, in 3 after 6, in 2 after 28 weeks, in 3 after 7 months; in New Hampshire and Delaware there is no definite rule; and in Maryland any product of human gestation that may be recognized as such must be registered.

In Austria the law prescribes that all children who, being born dead, have reached a state of development which indicated the possibility of independent existence, are to be registered; but that all others, which means non-viable children, are to be regarded as abortions or miscarriages and registration of such births is not required. It is remarked that in Roman Catholic districts, stillborn children are baptized, and as registration of birth is made by the religious communities, registration of some stillbirths is made as live births, rendering the stillbirths statistics inaccurate.

In Spain, registration of all stillbirths is compulsory since 1919. Registration which includes those born without signs of life, and those born alive but dying within 24 hours after the severance of the umbilical cord, must be effected within 24 hours of the occurrence of such birth.

In the Republic of Portugal a special register is kept for stillbirth but no definition of live or stillbirth is given. In Belgium, officially a stillbirth is defined as the birth of a dead child after the 180th day of gestation. In Holland, the procedure is quite similar to that followed in Belgium with the exception that no mention is made of the period of uterine gestation. In Denmark, a footnote on the birth certificate gives the following definition of a stillbirth:

> Premature born children, born alive, to be recorded as live births. And a fetus born without obvious signs of life in the 29th week of pregnancy or after should be recorded as a stillbirth; but if born before the 29th week it should be deemed a miscarriage and not recorded.

In Norway, stillbirths are defined as births without life after the 28th week of pregnancy. Abortion and stillborn fetuses born before the end of the 28th week are not to be registered. In England and Wales, no record of stillborn children may be made in a register of births and deaths. But, if a child is born alive, it matters not how soon it may die, both the birth and the death must be registered. A child is deemed to be stillborn when, after being completely born, it has not breathed or shown any sign of life. The term completely born is understood to indicate

complete expulsion from the body of the mother, independently of complete separation. No mention is made of the product of miscarriage or abortion, and it seems that whenever a child is born alive according to the above definition whatever be its fetal age, a live birth is registered.—Eugene Gagnon, *Canad. Pub. Health J.*, 22: 16–27 (Jan.), 1931.

Statistics for Northern Ireland—The latest enumerated population of Northern Ireland, obtained for the Census of 1926, is 1,256,561. The estimated population in the middle of 1929 is 1,246,000, including military. The results of the year's registration show that a further increase in the marriage rate has been accompanied by a further decrease in the birth rate, and that for the first time since 1924 the death rate has increased.

Births registered during the year numbered 25,410, a decrease of 550, or 2.1 per cent, as compared with the previous year. The birth rate was 20.4 per 1,000 of the estimated population, being 0.4 below the rate for the previous year and 2.4 lower than the average rate for the 10 years 1919–1928. The proportion of male births to every 100 female births was 105.5. Deaths registered during the year numbered 19,822, an increase of 1,818 or 10.1 per cent, as compared with the previous year. The death rate was 15.9 per 1,000 of the estimated population, being 1.5 above the rate for 1928 and 0.2 above the rate for the previous ten years 1919–1928. The relatively high death rate of 15.9 per 1,000 in 1929 is due mainly to a large increase in the number of deaths from influenza, bronchitis and pneumonia, as a result of an epidemic in the first quarter of the year.

The influenza epidemic had the effect of increasing the death rate from this disease to 107.1 per 100,000 of the population, compared with an average rate of 59.4 for the years 1919–1928. Deaths from all forms of tuberculosis show a decrease of 7.7 per cent on the number registered in the year 1928, the death rate being 129.3 per 100,000 in 1929, and 139.6 in 1928, while the average for the last 10 years preceding 1929 was 169.0. Cancer has shown an increase every year since 1922, with the exception of 1926 and 1928, when slight decreases were recorded. In 1929 the mortality rate was 117.9 per 100,000. Puerperal mortality in 1929 was 6.26 per 1,000 births as compared with the previous 10 years' average rate of 6.18.

Deaths of infants under 1 year of age numbered 2,174, or 86 per 1,000 births registered, as compared with 78 per 1,000 in 1928, and an average of 84 per 1,000 for the 10 years preceding. In 1929 and 1928 the rates for deaths of infants under 1 year of age were 74 and 65 per 1,000 births, respectively, for England and Wales, 87 and 86 for Scotland, and 70 and 68 for the Irish Free State.—*The Registrar-General's Eighth Annual Report,* Government of Northern Ireland, pp. 6–24, 1929.

The Extent of Gonorrhea and Syphilis in the United States—A series of prevalence studies has been carried out in communities with a total population of more than 17,758,000 located in various parts of the United States, and representative of the population as a whole. It is estimated that there are in the whole country 643,000 cases of syphilis and 474,000 cases of gonorrhea constantly under medical care. Twenty-one per cent of the cases of gonorrhea and 40 per cent of the cases of syphilis are treated in public clinics.

The combined case rate for gonorrhea and syphilis for the male population was nearly twice as high as that of the female, the rates being 9.65 and 4.85 per 1,000, respectively. This difference

was more pronounced for gonorrhea than for syphilis.

Venereal diseases as a group far outnumber all other reported infections except influenza in times of an epidemic. The experience in the military forces of this and other countries in peace and in war time shows the venereal diseases to exceed any other condition as a cause of noneffectiveness. Among the second million men drafted during the World War, 56.7 per 1,000 were found by a casual clinical examination to have a venereal disease.

It is estimated that in the continental United States there are 423,000 new cases of syphilis which seek treatment during the early stage (the first year) of the disease, and, likewise, 679,000 new cases of gonorrhea each year which come under medical care during the first three months of the infection. This incidence represents an annual attack rate per 1,000 population of 3.46 for syphilis and 5.71 for gonorrhea. Parran and Usilton (*J. Soc. Hyg.*, 16: 31, 1930), estimating 643,000 cases of syphilis and 474,000 cases of gonorrhea constantly under medical care in the United States, give case rates for gonorrhea 4.88 for males and 1.78 for females; for syphilis 4.77 for males and 3.08 for females.

Approximately 31 per cent of the total cases of venereal diseases under treatment are found among presumably indigent persons, inasmuch as this percentage of total cases were being treated at public expense in clinics, hospitals or other institutions. The peak-age group for the onset of both gonorrhea and syphilis has been determined as 20 to 25 years.

A greater prevalence of venereal disease exists among the negroes than among the white population, the rate per 1,000 being 8 for white and 11 for colored population. A recent study of the rural negro in a southern state indicated that as high as 24 per cent of the entire population of more than 1 year of age showed a positive Wassermann reaction.

The results of a number of published reports over a 10-year period indicated that of women admitted to maternity hospitals 6.9 per cent had a positive Wassermann reaction. General paralysis contributes 4 per cent of the population of our insane institutions. Syphilis stands first or second among the most frequently reported infections to the U. S. Public Health Service from the state health departments. Gonorrhea stands about fifth.

Among the general male population between the ages of 15 and 45 years it is estimated that the number of noneffective days lost through venereal diseases would approximate 21,000,000 days per annum, or a loss of approximately a half a day for each male of the United States between the ages of 15 and 45 years.—*Am. J. M. Sc.*, 158: 873–874 (Dec.), 1930.

Vital Statistics in England and Wales, 1929 and 1930—The economic depression in England and Wales seems to have had little effect upon the marriage rate of the country. During 1929 there were 15.8 marriages per 1,000 population; this was the highest rate since 1921. On the other hand the birth rate of 16.3 in both 1929 and 1930 was the lowest ever recorded since the establishment of the civil registration. The birth rate was the lowest of any European country except Sweden in 1929. In France the birth rate, which before the war was the lowest in Europe, has decreased more slowly than in most countries so that in 1929 it ranked above England and Wales, Norway, Sweden and Switzerland.

The death rate of 13.4 per 1,000 population in 1929 was the highest since 1919. The high rate was caused chiefly by an increase in the deaths from influenza and other respiratory diseases,

whooping cough and diseases of the heart. The first quarter of 1929 was marked by a period of severe weather, the coldest since 1895, and was accompanied by a serious outbreak of influenza. Preliminary reports for 1930 show a considerable decrease in mortality to a rate of 11.5, the lowest on record.

The adverse conditions of 1929 were also responsible for the increase in the infant mortality rate which rose from 65 per 1,000 live births in 1928—the lowest hitherto recorded—to 74 in 1929. According to preliminary reports for 1930, however, infant mortality reached a new low rate of 60 during the past year.—*Manchester Guardian Weekly*, 24: 129 (Feb. 13), 1931; *Lancet*, 1: 203 (Jan. 24), 1931; *Registrar-General's Statistical Review of England and Wales*, 1929.

Vital Statistics of the Irish Free State, 1929—The annual report of the Registrar-General of the Irish Free State for 1929 estimates that the population of the State in the middle of the year was 2,946,000. The figure given by the census of 1926 was 2,972,802. There is an increase in the number of deaths as compared with 1928, and a decrease in the numbers of births, of marriages, and of emigrants. The deaths represented a rate of 14.59 per 1,000 of the estimated population, the total number of deaths being 42,991. Of the causes of death, heart disease is placed highest with 5,616; tuberculosis next with 3,875; followed by cancer with 3,116; and influenza 1,659.

There has been an increase in the number of deaths by violence from 883 to 971; this is mainly due to two distinct causes—the increase of deaths from motor accidents, and an increased number of suicides. The total number of deaths from all forms of vehicular transport increased from 150 to 200, the number of suicides from 98 to 111. Up till recently suicide was uncommon in Ireland, but it appears to be taking a place among the considerable causes of death.

The mortality from tuberculosis continued to show a gratifying decline. In 1919 the number of deaths from tuberculosis was 5,839, and in 1929 was 3,875, almost every intervening year showing a fall. The deaths from cancer are 74 fewer than in 1928.

The infant mortality was 70 per 1,000 births. The birth rate shows a decline when compared either with the rate in 1928 or with the average in the 10 years 1919–1928. In the period 1911–1915 the birth rate was 24.9 per 1,000 of the population; in 1924–1928 it was 20.57; in 1929 it was 19.78.

Illegitimate births constituted 3.2 per cent of the total. The mortality among illegitimate children was appallingly high; no less than 29.4 per cent died within the first year of life—a mortality more than four times the general infant mortality. The net emigration for the year—18,145—was the lowest on record, the average for the period 1911–1926 being 26,946. Nevertheless, it was more than enough to counterbalance the natural increase of population, or excess of births over deaths.—*Lancet*, 1: 156 (Jan. 17), 1931.

One Hundred Thousand Deaths—Ninety-seven thousand people were killed in the United States by accidents in 1929; this figure is likely to be increased to 100,000 before the year 1930 closes. Accidents this year will account for more deaths in the United States than does tuberculosis. Among males, accidents are second in importance to heart disease as a cause of death, and tuberculosis is seventh.

The 1929 accident fatalities exceeded those of 1928 by 2 per cent; but there was an increase of 28 per cent since 1920. The accident death toll of 97,000 last year is about 2,000 in excess of the

figure for 1928, an increase as large as any which has occurred in any single year since 1925. The 1929 accident fatalities had their origin in the home in 23,000 cases. The hazards of occupation accounted for another 23,000 deaths. In public places, there occurred some 51,000 deaths. The 51,000 fatalities in public places included 31,000 arising out of the use of motor vehicles. These 31,000 automobile deaths were the outcome of not less than one million injuries. These figures show an increase in motor vehicle deaths alone amounting to 3,000, or more than 10 per cent over the 1928 figure. Preliminary figures for 1930 show an increase of 4 per cent for the current year; or a total of some 33,000 deaths in automobile accidents before the end of the year.

Down to 1926, there had occurred each year a decrease in the number of fatalities per 100,000 cars registered. But beginning in 1927, this figure rose to 100.2 deaths for 100,000 automobiles; in 1928, the figure was 101.7, and in 1929, the fatality rate on the basis of 100,000 automobiles registered was 104.5. The highest death rates from automobile use occurred in the Pacific Coast States—34.5 per 100,000 in 1928; the lowest in the West South Central States (14.1 per 100,000). Contrasting urban and rural experience, we find in cities over 100,000 population the increase was from 21.1 to 23.8 per 100,000 or 13 per cent; in rural areas, the rate increased from 12.1 to 16.4 per 100,000 or 27 per cent between 1925 and 1928 or twice as fast as in the large cities. Deaths of children in automobile accidents decreased from 5,110 in 1927 to 4,943 in 1928. In 1928, 19.8 per cent of all automobile fatalities were of children under 15 years of age; in 1922, the figure was 29.4 per cent. According to the Interstate Commerce Commission, railroad grade crossing deaths involving automobiles were 2,102 in 1929, a decrease from 2,170 registered in 1928. Railroad crossing accidents where passenger automobiles were involved caused 1,741 deaths in 1929, a decrease from 1,820 in 1928.

Other public accidents not involving a motor vehicle accounted for some 20,000 deaths last year. Of these, some 8,500 were drownings, with July as the peak month. Persons under 25 years of age accounted for 56 per cent of the drownings. Firearms accounted for 3 per cent of all accidental deaths, or an annual toll of 3,000 in the United States. It was reported that for the 30,000,000 school children in the United States, some 700,000 accidental injuries occur annually, with 6,300 ending fatally. Accidental injury accounts in all probability for about 2,700,000 days of absence in our schools annually. Of the 23,000 fatalities in the home during 1929, in the United States, falls account for 40 per cent; burns, scalds and explosions for 24 per cent; asphyxiations for 14 per cent; and poisons for 9 per cent. The United States heads the list of all civilized countries of the world in its accident death rate—79.2 per 100,000. Canada was next in point of accident fatality rate, with a figure of 62.5 per 100,000; England and Wales had an accident death rate of 41 per 100,000, almost one-half the figure for the United States.—*Trans. National Safety Council*, 3: 3–7, 1930.

PUBLIC HEALTH ENGINEERING

ARTHUR P. MILLER, C. E.

CONTROL OF CROSS-CONNECTIONS IN TEXAS CITIES

W. N. DASHIELL AND EDGAR WHEDBEE

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PRIOR to about 1926 cross-connection of private water supply systems with the public water supply systems of practically all of the cities of Texas was permitted without much thought being devoted to the protection of the city supplies. There were no ordinances or water department regulations dealing with this question and in nearly all instances no records were kept of the location or any of the details of the connections. As underground water is comparatively plentiful in Texas, there has gradually developed a cross-connection problem in practically every city in the state.

There are no specific laws governing the installation of cross-connections in the *State Sanitary Code* which is used as a basis for the activities of the Sanitary Engineering Bureau of the Texas State Department of Health. A revision of the code presented during the 41st legislature, which met early in 1929, failed to pass, due possibly to the time required by more popular pending legislation than to any organized opposition.

A section of this proposed code provided that after December 31, 1930, no physical connection between the distribution system of a public water supply system and that of any other system shall be permitted unless such other water supply is of a safe sanitary quality, and the interconnection of both supplies is approved by the State Department of Health, and further provided that where such physical connection existed and included two gate valves with indicator posts, two check valves of a design approved by the State Department of Health with drip cock and gauges for testing all located in a vault of water-tight construction, readily accessible for inspection, the date of discontinuance may be temporarily extended with the permission of the State Department of Health.

In the absence of effective legislation the work of cross-connection elimination has developed rather slowly. Perhaps the most effective work has been done in coöperation with the U. S. Public Health Service in its program of certification of water supplies used by common carriers operating in interstate traffic. Approximately 180 of the 500 or more largest water supplies in Texas both privately and municipally owned come under the federal certification procedure.

The Texas State Department of Health Division of Sanitary Engineering takes the position that all cross-connections are potentially dangerous and that every city should make a thorough cross-connection survey with a view to securing the prompt elimination of the more undesirable ones and to furnish data as a basis for developing a definite program for the gradual elimination or satisfactory correction of each. During 1928–1929 such surveys were instituted in Dallas, Fort Worth, Houston,

and San Antonio, and in several smaller cities.

The action taken by these cities has been followed by many others in starting programs of cross-connection control largely through educational and corrective procedure rather than enforcement through ordinance.

This paper deals only with that phase of cross-connection control relating to dual supplies for fire protection and auxiliary domestic and industrial supplies. The elimination of other cross-connections, such as with plumbing fixtures and swimming pool filters, has been largely attempted by educational means, through the efforts of the State Health Department and the Association of Master Plumbers.

During the spring and summer of 1929, the City Water Department of Dallas, coöperating with the State Department of Health, conducted a cross-connection survey of its water supply system. This survey was made as a part of the permanent program which Dallas now has under way to correct various sanitary defects in the public water supply system in order to secure unconditional certification on the basis of the Treasury Department Standards.

A list of 184 potential cross-connections which had been compiled by the Dallas City Health Department was found, to which additions had been made at intervals by the Water Department without complete confirmation by field investigation. These were the only available records at the beginning of the survey.

The procedure adopted was to visit all premises listed and where investigation revealed the presence of cross-connections detailed sketches and descriptions of the physical layout, showing points of interconnection, sizes of lines, valve control provided, static pressures and other pertinent information were prepared. In every instance where a secondary supply was found, considerable time was spent in definitely establishing the separation of the two supplies.

As a result of the survey, 44 cross-connections were located of which 8 were readily eliminated. Four of the connections were with supplies obtained from shallow dug or driven wells, and 3 with grossly polluted water.

The remainder of the group, 37 deep drilled wells used as auxiliary supplies for office buildings and industrial plants, compares well with the primary supply from the standpoint of potability and safety. With but one or two exceptions they are pumped by air lift apparatus. Three water bearing sands are used extensively in this area as follows: the Woodbine sands from 950–1,000 ft., the Paluxy sands from 1,600–1,800 ft. and the Trinity or basement sands from 2,200–2,400 ft. These lie in the Comanchean or Lower Cretaceous formation of the Mesozoic era and until very recent years produced artesian wells.

A number of the wells were subject to overflow from storm water or stoppage from sewage collection lines. Many of the ground reservoirs into which the wells discharge were open and subject to surrounding contamination.

There were no double check valve installations, and single cast iron checks were commonly used in the fire protection connections. Still other connections were found without check valves and in these the manipulation of one or two gate valves would establish an open connection with the primary supply. In nearly every instance there was no periodic bacteriological control of the water.

Effective July 1, 1929, the Dallas Water Department, through its Industrial Engineering Division, instituted a standby service charge affecting those industries which had city water connections and maintained a private secondary water supply. The charge is based on the average total monthly consump-

tion of each institution from its several water supplies, taken from the records of the preceding year. As Dallas does not have a sewer rental, the benefits of city water and sewer service were donated to those industries maintaining a secondary water supply system, prior to the time the standby charge was instituted. In March, 1930, Dallas passed an ordinance prohibiting any new cross-connections; providing for the disconnection of unsafe interconnected water supplies; and outlining sanitary improvements for the remainder of the cross-connections, including supervision by the Dallas Water Department; and further providing that after June 1, 1935, cross-connections heretofore provisionally permitted should be removed.

As a result of the above outlined activities of the Water Department, together with the establishment of a new attractive schedule of water rates for industrial consumers, there are at present only 5 cross-connections with the public water supply system, and it is expected that all will be eliminated within the next year or two. The Water Department also reports that its industrial water sales have been increased by the amount of 5 million gallons per day. At an average rate of $.12 per 1,000 gallons, this increase represents additional revenue of approximately $15,000 per month.

Heavy rainfall upon the watershed of Buffalo Bayou in the last days of May, 1929, resulted in the flooding of the central water supply pumping plant of the City of Houston and showed the necessity for emergency relief measures being instituted. A reorganization of the City Water Department was effected to include a sanitary engineering division, the duty of which should be to administer a definite improvement program for the water supply system. Houston obtains its water supply from deep drilled wells located at 8 pumping stations in the city.

Part of the program of the Sanitary Engineering Division was to conduct a thorough cross-connection survey of the water supply system. With these data as a basis a cross-connection control ordinance was prepared and adopted during March, 1930. Reports made to the State Health Department show that up to the time the ordinance was adopted approximately 57 cross-connections had been surveyed by the division. We have been unable to secure accurate information of the progress of elimination since the adoption of the ordinance last March.

San Antonio made a survey of cross-connections with the public water supply system in the early months of 1930. The survey was made by the San Antonio Water Board in an attempt to remove defects in the public water supply system listed as such in the water certification procedure. Thirty-two cross-connections were located as a result of the survey and a water board order was passed reaffirming the policy of not permitting any new cross-connections, and providing for the elimination of all existing connections. At present there are reported to be only 3 cross-connections and plans are under way for their elimination.

It is reported that the last cross-connections at Galveston were eliminated about two years ago and that no future cross-connections will be allowed in accordance with the city health code.

Fort Worth has had under way during the last year a program of cross-connection elimination similar to the one being carried out in Dallas. The water bearing strata from which Fort Worth derives its private well supplies are the same as those from which Dallas obtains the major part of its private supplies. The dip of these strata is such that their depth is approximately 1,000 feet less in Fort Worth than in Dallas. The procedure adopted in making the survey is similar to that em-

ployed in Dallas and the work is being conducted jointly by the City Health and Water Departments.

Approximately 15 cross-connections have been eliminated as a result of the survey and there still exist for correction about 30 connections with private water supplies.

Fort Worth also has a publicly owned separate raw water system, supplied with Trinity River water, maintained primarily for fire protection and street cleaning. Nineteen cross-connections between this public raw water system and the public water supply system have been surveyed. All of these were made for the purpose of securing a dual supply for building fire sprinkler systems. The pressure in the raw water mains is approximately 20 lb. per sq. in. higher than that normally maintained in the domestic system. Sixteen of the 19 connections have double cast iron check valves for the protection of the city supply and the remaining three have a single cast iron check valve. Many of these valve installations are so located as to be inaccessible to periodic inspection and several of the vaults are flooded with water. One installation had the check valves buried in concrete. The public raw water system was built in 1911 and there are no records to show that the check valves have been inspected since their installation.

An ordinance requiring physical separation of the raw water system and all private water supplies from the domestic system has been drafted and will undoubtedly come before the City Council for passage within the next few weeks. The present policy of the water department is not to permit new cross-connections and to work toward the elimination of the existing ones pending the passage of a control ordinance.

In addition to the brief résumé of the above activities, considerable work has been done in many smaller Texas cities. At Texarkana 6 cross-connections between the privately owned city water system and private water supplies were eliminated this year in approximately 6 weeks following a survey by representatives of the Texas State Department of Health and the Texarkana City Health Department. Similar work has been done at Beaumont, Port Arthur, Orange and other places.

While the program as a whole has been extended over a considerable period of time, but more active during past 2 years, records in the State Department of Health show that approximately 500 cross-connections have been investigated in recent years of which number more than 300 have been eliminated. It is also felt that the statewide publicity on this work and the additional momentum gained from the definite position that the U. S. Public Health Service has taken with regard to cross-connections and the resulting recent action of our larger cities are doing much to reduce the cross-connection problem in Texas.—Paper read before the Public Health Engineering Section of the A. P. H. A. at the Fifty-ninth Annual Meeting at Fort Worth, Tex., October 28, 1930.

INDUSTRIAL HYGIENE

EMERY R. HAYHURST, M. D., PH. D., AND LEONARD GREENBURG, M. D., PH. D.

Sixth International Congress of Industrial Accidents and Diseases—This Congress which is to be held in Geneva, Switzerland, August 3–8, 1931, is the same as one which met in Budapest three years ago. Representatives have now been named for 17 countries, while several more are expected. For the United States the President of the Delegation is Dr. Francis D. Patterson, P. O. Box 4061, West Philadelphia Station, Philadelphia, Pa., and Correspondents: Professor Emery R. Hayhurst, Ohio State University, Columbus, O., and Dr. Francis D. Donoghue, Medical Adviser, Commonwealth of Massachusetts, Department of Industrial Accidents, State House, Boston, Mass. The balance of the American committee is rapidly being formulated and those interested should correspond with some one of the three above named.

The meeting will be a Joint Congress representing the activities of the Permanent International Committee on Accidents and the Permanent International Committee on Industrial Medicine. The activities have been divided into two sections: A, Surgery, and B, Medicine. The particular subjects so far devised are as follows:

Sections A and B

I. Cutaneous Affections in Relation to Occupation (Accidents and Diseases)
II. The Influence of Previous Health on the Results of Industrial Accidents and Diseases

Section A

III. Sequelae and Final Results of Traumatic Wounds of the Spine
IV. Traumatism of Blood Vessels (Arthritis and Thrombophlebitis)

Section B

V. Illness Affecting Men Working upon Cement and Artificial Stones
VI. Reaction of the Organism toward the Toxic Substances used in Industry
VII. Fatigue

A certain number of additional subjects will also be dealt with. An exhibition of photographs, radiographs, and plaster casts relating to the subjects of the Congress will be on view at the university. Those who wish to exhibit should get in touch with Dr. Jentzer, 8 Rue de l'Université, Genève.

The three persons above named as heading up the American delegation have been supplied with printed material setting forth in full the details of the Congress and will be glad to dispatch to anyone interested a unit of the material so long as the supply lasts.

The Honorary Presidents named for the Congress are Dr. Kaufmann, Zurich; Professor Devoto, Milan; M. Albert Thomas, Geneva; Sir Thomas Oliver, Newcastle-on-Tyne; and Dr. Pometta, Lucerne. E. R. H.

High Lights of the Medical and Health Program of the Consolidation Coal Company, Inc., Year of 1930—

1. *163,024* individuals received medical attention. *42,768* of these were seen in the homes.
2. *30,837* individual typhoid inoculations were given. *11,002* persons were vaccinated for smallpox.
3. Typhoid fever and smallpox have been practically eliminated and other communicable diseases materially reduced.
4. *5,493* physical examinations were given to applicants for employment.

5. *5,027* occupational injuries were attended, requiring *11,408* subsequent attentions.

6. *835* babies were born; *449* being boys and *386* girls.

7. Total deaths numbered *204*.

8. *350* clinics were held with a total attendance of *3,841*.

9. *5,709* physical defects were corrected, most of these being dental, nutritional, nose and throat defects.

10. *50* classes in home hygiene were taught, requiring *346* sessions with a total attendance of *4,450*.

11. Sanitary inspection committees made monthly inspections of most communities.

12. The "Jenkins" Hospital was accepted and accredited by the American College of Surgeons.

13. This hospital admitted *638* patients for major illness and injury.

14. *350* food handlers were given physical examinations.

15. Water and milk supplies were followed up by monthly inspections and laboratory examinations.

16. Regular monthly medical staff meetings were held in the larger divisions.

17. Hundreds of cases were provided with material relief through the efforts of the nurses.

18. Community organizations, such as Parent-Teacher Associations, Girl and Boy Scouts, have been fostered and developed by the nurses.

19. The staff and personnel consisted of 23 full-time, several part-time physicians and 12 public health nurses, coördinating with other agencies, health departments, private physicians and hospitals.

20. Facilities were increased, and program extended with a decrease in cost.—

D. J. Kindel, Medical Director, Fairmont, W. Va., Feb., 1931. E. R. H.

The Physiological Effects of High Concentrations of Carbon Dioxide—From the summary: The subjective and objective effects of toxic concentrations of CO_2 on men were studied, the percentages varying from 5.5 to 12.4 per cent with oxygen ranging from 14.4 to 39.7 per cent.

The concentrations of CO_2 were so excessive as to be tolerated for only a comparatively short time. The periods of exposure did not represent the extreme limit of endurance but a stage was reached beyond which serious symptoms were impending. The maximum period of exposure was 22 minutes at 6 per cent and the minimum ½ minute at 10.4 per cent CO_2.

The respiratory rate per minute showed a tendency to a slight increase above normal; the pulse rate was accelerated in moderate degree; the systolic blood pressure always increased and rose with ascending CO_2 concentration—at 6 per cent CO_2 the increase was 18 m., at 10.4 per cent it was 52 m. and at 12.4 per cent 97 m. maximum; the diastolic blood pressure showed in general a trend similar to that of the systolic pressure; the average minute-expiration volume increased as follows: 203 per cent at 6 per cent CO_2, 225 per cent at 7.5 per cent, 228 per cent at 8.8 per cent, 279 per cent at 10.4 per cent, and only 153 per cent at 12.4 per cent CO_2. The last-named result is of particular interest, as it indicates a fall in the lung ventilation at this concentration of CO_2, whereas there was an increase up to and including 10.4 per cent CO_2. There were wide individual differences between subjects, as was observed in the other physiological responses.

The subjective symptoms were as follows: marked dyspnea resembling the effect of extreme physical exertion, dizziness, flushing and sweating of the face, feeling of stupefaction and an apprehension of impending collapse. The after-effects were practically limited to moderately severe headache but not persisting beyond 30 minutes. There was marked individual variation in the severity of the symptoms, certain subjects showing much less intolerance to high concentrations of CO_2 than others. It is not believed that any of the subjects could have withstood 10 per cent CO_2 for longer than 10 minutes without losing consciousness.

There was no evidence that high oxygen alleviated the toxic effects of the excessively high concentrations of CO_2 em-

ployed in these experiments.—E. W. Brown, Commander, Medical Corps, U. S. N., *U. S. Nav. M. Bull.*, 28, 4: 1930, 13 pp. ill. E. R. H.

Report, Division of Industrial Hygiene, Ohio Department of Health—This is a brief but comprehensive report of the Division's work which is divided into two parts, the first covering the period from July 1, 1915, to December 31, 1928, and the second for the calendar year 1929. These are the first printed reports summarizing the activities of the division's work for 15 years, due to the lack of funds for publishing same. As it is, the two respective reports are contained in a single volume which also encompasses the reports of all the divisions of the State Department of Health, both for the 14-year period and for the year 1929, within a total of 406 pages, including tables, graphs, and illustrations. Necessarily the material is therefore very compact and there is evidence throughout the volume of great thought being given to saying much in few words.

The 14-year report of the Division of Industrial Hygiene concerns the early history of the subject of industrial hygiene in the state, beginning in 1886, the names of the chiefs of the division since it was founded May 15, 1913, the major investigations made, the relation of the matter of compensable diseases to the Industrial Commission as well as the Department of Industrial Relations; the prime functions of the division; a table summarizing all of the occupational diseases reported to the division since it was established in 1913—a total of 10,761 case reports; and a summary of carbon monoxide poisonings occurring in the state and officially reported, these being chiefly of domestic origin.

The 1929 report of the division concerns its present personnel, its main activities during the year, and a table showing an analysis of the 1,411 case reports of occupational diseases received during the year. Of these, 1,305 came under the *compensable* list under the state law while the *non-compensable* group was composed of 37 reports due to *specific agents* (chiefly poisons), 33 reports composed of various bodily *afflictions* (the agents not specified), and 36 reports which were regarded as *acute accidental*, i.e., due to single or limited exposures, and therefore not classifiable as occupational "diseases."

Another table analyzes the industrial sources of 183 cases of *lead poisoning* reported during the year, of which 5 were among females; another table presents an analysis of 985 case reports of industrial *dermatitis*, classified according to offending agents—the chief ones being oils and cutting compounds (197), rubber (179), benzine, gasoline, naphtha (47), plating solutions (54), "formica" (39), lime and cement (28), acids (35). Reference is made to an exhaustive study of *silicosis and tuberculosis* in the sandstone quarries of Lorain County which was started in 1926–1927 by Dr. Hayhurst and Dr. Kindel and was completed by the present personnel of the division and Dr. C. D. Barrett, health commissioner of Lorain County, and published in the *Journal of Industrial Hygiene*, September, 1929. Here, 919 workmen were stereoradiographed with a finding of pulmonary pathology in 55.1 per cent, including 28.5 per cent with silicosis in various stages. The total tuberculosis was, however, but 1.9 per cent. Likewise general disability was low. These findings checked relatively closely with those of the tuberculosis statistics for the community. The period for developing silicosis, namely, 16.24 years, was over twice that reported elsewhere. The rock was found to have an average content of from 92.15 to 97 per cent crystalline silica (SiO_2).

Likewise, an investigation of 32 cases of *occupational lung diseases* occurring

among sandblasters, emery grinders, stonecutters, and pottery men, is reported upon briefly.

Tables of domestic *carbon monoxide poisoning* mishaps, which are required to be officially reported in the state, are likewise presented as well as a list of the more intimate duties of the personnel of the division, of special trips made, notable persons visiting the division during the course of the year, chief publications made, radio talks, special lectures, etc.—Byron E. Neiswander and Emery R. Hayhurst, *Thirty-First Report (43d year), Ohio Department of Health*, 1931, pp. 188–195, 373–382. E. R. H.

Poisoning by Hydrocyanic Gas—The annotation is based upon the article by Professor Joseph Barcroft in the *Journal of Hygiene*, January, 1931, page 1. It was found that the relationship between the concentration of hydrocyanic gas and the duration of exposure to it is not a simple one. The size of the animal was also found to be no criterion of its ability to survive, although when the total amount of HCN inhaled by each animal was calculated, it was found to be the same when the total ventilation rate of two animals like the cat and the rabbit was considered. Thus the concentration of HCN would be the same in the blood of both animals when death occurs. "The toxicity of the poison is due to its paralyzing effect upon intercellular oxydases, and the respiratory center is the earliest of the vital tissues to succumb. Canaries and pigeons are much more susceptible than rats and mice."

An actual experiment was made where "a man" and a dog were both enclosed in an airtight chamber, the atmosphere of which contained HCN at a concentration of about 1 part in 1,800. The dog became unconscious in 1½ minutes, while the man felt no symptoms. It is known also that mice and canaries are more easily killed than the dog, and for this reason the mouse is sometimes used for testing the toxicity of an atmosphere. Here, however, a fallacy may arise since the observer who carries the animal into a suspected atmosphere is performing work, whereas the mouse may be at rest so that its relative sensitiveness is diminished. Where the concentration of the gas is low (0.1 mg. per litre) the best indicators are birds. A man could breathe this atmosphere for 10 minutes without harm, whereas canaries would be dead in 2 minutes. Precautions must be taken by the observer, however, not to exert himself unduly.

In regard to treatment artificial respiration and injection of glucose have been proposed. The latter was found, however, to have no protective action. Since the heart may go on beating for some time after respiration ceases, the greatest hope for recovery seems to lie in artificial respiration. This will also assist in dissipation of the HCN, and, if oxygen be used instead of air, it seems natural to assume that the dissipation of the toxin will be hastened.—*Lancet* (London), 5607: 362–363 (Feb. 14), 1931. E. R. H.

The Value of High Oxygen in Preventing the Physiological Effects of Noxious Concentrations of Carbon Dioxide—The following is taken from the summary of this illustrated reprint of 31 pages, including bibliography:

The two objects of the present investigation were to determine the following: (1) The influence of high oxygen on the noxious effects of high carbon dioxide in submarines and (2) the effect of high concentrations of carbon dioxide on physical and mental efficiency. The term high oxygen in these experiments signifies the maintenance of approximately normal oxygen under conditions of rebreathing in a closed space.

A total of 11 persons served as subjects of the tests, 4 being ordinarily designated for each experiment. The duration varied from 5⅓ to 12 hours, the average approximating 8 hours. The subjects were not aware of the air conditions, thus eliminating the psychological factor in connection with the effect of oxygen.

Where the final carbon dioxide ranged from 4.7 to 5.2 per cent and the oxygen from 17.8 to 15.5 per cent (the oxygen being gradually reduced by rebreathing in proportion to the rise of carbon dioxide), no effects on breathing were noted at 2 per cent carbon dioxide except on exertion. The subjects in general were not definitely conscious of increased respiratory effort at rest until approximately 3.5 per cent was reached.

At the close of the tests of this group, slight depression, headache, chilliness, and fatigue were the chief symptoms, while body temperatures were subnormal, breathing was labored, but there was no feeling of actual dyspnea with carbon dioxide below 5 per cent.

A group of four tests was conducted in which the final carbon dioxide varied from 4.3 to 4.7 per cent and oxygen from 18.2 to 23.4 per cent. Here the subjective symptoms appeared to be somewhat less but the differences were not clear-cut. The depth and rate of breathing were not influenced.

It is not considered advisable to expose subjects to concentrations higher than 6 per cent of carbon dioxide where oxygen is not supplied.

Headaches persisted for 1 to 3 hours following the tests, but there was a wide individual variation in the type and severity of symptoms. Chilly sensations were general with a final body temperature of 1° to 3° F. subnormal. Persistent fatigue subsequent to the tests was an outstanding symptom.

An air combination of low oxygen and low carbon dioxide was also set up. Initial symptoms of oxygen depletion were noted between 13 and 14 per cent of oxygen, but no signs were manifested with oxygen between 14 and 15 per cent with low carbon dioxide, but the train of symptoms associated with 5.8 per cent of carbon dioxide and 14 to 15 per cent of oxygen were severe and were lessened to a considerable extent when oxygen was kept at the normal level.

Army Alpha cancellation and addition tests were carried out at successive intervals. The functions of attention, memory, association and deduction were involved. The results were striking in that the psychological effects were slight.

It is felt that the personnel could carry on their usual submarine duties for a protracted period, if carbon dioxide did not exceed 5 per cent, but it is believed that the majority would be completely incapacitated where carbon dioxide was above 6 per cent, which is regarded as the critical point. " The supply of oxygen would improve physical and mental efficiency between 5 and 6 per cent of carbon dioxide but would not prolong it beyond the latter figure."—E. W. Brown, Commander, Medical Corps, U. S. N., *U. S. Nav. M. Bull.*, 28, 3: 1930. E. R. H.

Workmen's Compensation Law and Industrial Board Rules—This 155-page pamphlet discusses in great detail the amendments, additions and annotations to the New York State Compensation Law up to November 1, 1930. It is impossible to present any detailed review of this pamphlet, except to point out that it is a mine of valuable information concerning the New York State Law and its interpretation.—New York State Dept. of Labor, Bureau of Statistics and Information. L. G.

FOOD, DRUGS AND NUTRITION

WALTER S. FRISBIE

A New Factor in Nutrition—In feeding a concentrated product of B vitamins to rats on a vitamin-B free basal ration, it was noted that the hair of both the black rats and the black and white rats became silver gray, different in appearance from the result of anemia and without reduced hemoglobin. While rats appeared to be healthy, they were subject to xerophthalmia although there was no deficiency in vitamin A.

Reproduction was abnormal, some remaining sterile and others giving birth to litters which did not live. The material was given in greater amounts than is indicated for vitamin B sufficiency. With the addition of yeast to the diet, the discoloration of hair was observed in some cases but not in others. The material in question was supposed to be wheat germ from which the toxic elements had been removed. The introduction into the diet of wheat germ oil extracted either with acetone or ether did not prevent the hair from turning gray. Obviously removing impurities from germ oil also removed liposoluble vitamins. It is noted that this oil has been eliminated as a result of American experimenters who report toxic conditions. The authors comment that the doses were probably large enough to be harmful but in their series no adverse effects were noted with ordinary doses.

Subsequently, various alimentary meals were added which contained whole wheat as the base. In all cases, the rats without exception assumed the normal color of the hair. One group of rats was given whole wheat grains and the second the separated germ. In the first case, the hair remained black, and silvered in the second, and in the latter case the hair assumed its normal hue with the addition of whole wheat to the diet. In all these cases with discoloration of the hair symptoms resembling xerophthalmia appeared which were not cured by cod liver oil.

It is believed that the toxic element in the wheat germ is counterba'anced by substances in the entire wheat. However, if the special product or wheat germ solely is administered for a sufficient length of time, the hair color returns to normal; the animals practically acquiring an immunity to the toxic substances. These experiments were performed on a large number of animals and are to be continued.—A. Bakke, V. Aschehoug, and Chr. Zbinden, *Compt. rend. Acad. d. sc.*, 191: 1157 (Dec. 8), 1930.

Digestion; Efficiency with Various Foods and under Various Conditions—This work represents an extension of the study by Hosoi, Alvarex, and Mann (*Arch. int. Med.*, 41: 112, Jan., 1928), on Intestinal Absorption, particularly the effect of finely divided food and artificially retarded peristalsis. The work was performed on dogs after removal of the colon. The efficiency of the digestion was based on the moist weight of the food intake compared to the moist weight of the feces.

Both milk and sour milk were digested when given in large amounts. Residues in the former were 33 to 54 per cent, and in the latter 18 to 25 per cent, indicating better digestion with sour milk.

Cottage cheese was well digested but

impaired the digestion of food given the following day. The same effect was also observed with lard and lactose. Meat was better digested when fed in lumps than when comminuted and the same was true of potatoes. Raw meat was better assimilated than cooked meat. With fat, 10 gm. for each kg. of body weight appeared to be the limit. Raw egg albumin was practically undigested. Soft boiled and hard boiled eggs digested better, soft boiled eggs leaving the smallest residue. When raw egg was added to raw starch, the digestion of egg was improved, the residue of the mixed food being considerably less than the residue from either food alone.

Bread residues which were large were lessened when milk or coffee was given with the bread.

Cooked vegetables, such as potatoes, tomatoes, bananas, prunes, corn and peas, gave large residues, indicating poor digestion. Rice was almost perfectly digested. Relatively large residues were the result of feeding fruit juices, accounted for by the rapid passage through the bowel.

Forced feeding apparently had no effect on the amount of fecal residue. Excitement or anxiety in the case of one dog showed a residue of 77 per cent of the amount ingested, and when quiet, the figure dropped to 41 per cent in the case of the same dog. Heat and cold apparently had no effect.

The authors believe these studies will be a benefit in the treatment of humans requiring special diets; particularly noteworthy is the increased digestibility in combinations of foods neither of which is well digested alone, and the further effect of such substances as fats on the digestibility the day following ingestion. The experiment further revealed the fact that food taken in one large amount is better utilized than in several fractions at intervals. Frequent feedings stimulated peristalsis, causing the food to pass too rapidly. Purgatives and sodium bicarbonate interfered with digestion, again of interest in human cases, making it difficult to tell whether the disturbance is due to purging or to a disease.—John H. Childrey, Walter C. Alvarex, and Frank C. Mann, *Arch. int. Med.*, 46: 361 (Sept.), 1930.

Chemicals Added to Flour—In many parts of France, complaints have been made because of the inferior quality of the bread. The complaints doubtless in part date from the war period, when the scarcity of wheat made necessary the addition to wheat flour of flour derived from other grains or from legumes. In some instances the bakers have continued this practice, as it increases the profits. Some even add powdered minerals to increase the weight of bread.

Successive decrees have restricted the authorized use of flours other than wheat flours to the periods when there is a deficiency of wheat flour, which does not obtain at present. A decree dated November 7, 1930, prohibits the addition of any mineral matter that is not authorized by the superior council of hygiene. This decree was aimed particularly against the salts used to bleach gray flour and to facilitate bread making.

The council of hygiene has recently authorized the use of such substances as are employed only to promote the action of the yeast; namely, potassium bromate, at the rate of 2 mg. per 100 gm. of flour, which constitutes 10 mg. of bromide per kg. of flour, a negligible quantity, and even less than the amount contained in ordinary table salt; and ammonium persulphate, at the rate of 3 mg. per 100 gm. of flour. Sodium perborate, much used in the past, has been prohibited.

It has been stated that the reasons for the acceptance of these substances are that they facilitate the action of the yeast and the rising of the dough, and,

in addition, make it easier for the baker to prepare the yeast when French wheat is used.

Messrs. Desgrez and Bonn of Paris and Mr. Laborde of Strasbourg performed experiments on guinea pigs for 2 months, using wheat that contained the permitted quantities of bromate and persulphate. The animals thus fed developed as well as the control animals and exhibited no changes in their organs.—Paris Correspondent, Dec. 17, 1930, *J. A. M. A.*, 96: 282 (Jan. 24), 1931.

A New Cereal Mixture Containing Vitamins and Mineral Elements—It has been stated that cereal grain furnishes 30 to 60 per cent of the calories of the average diet. Since they are consumed largely for their energy-producing value, they constitute a most important part of the daily diet. Whole grain cereals are deficient in many of the minerals and in all of the vitamins. In view of this fact, a cereal mixture composed of wheat meal, oat meal, corn meal, bone meal, wheat germ, dried brewer's yeast, and alfalfa, has been devised which, in addition to supplying energy, furnishes the necessary minerals and 5 of the 6 known vitamins.

Vitamin A is obtained from the wheat germ, and the alfalfa, vitamins B_1 and B_2 from the wheat germ, and the brewer's yeast, vitamin D from the irradiation of the wheat germ or yeast, and vitamin E from the wheat germ. The minerals are obtained from the bone meal, wheat germ and alfalfa, 3½ oz. of cereal containing as much calcium as 22 oz. of milk. The iron content is almost twice that of egg yolk, while copper is present in good concentration, 1.3 mg. per 100 gm. of cereal.

The mixture has been used almost exclusively in the Toronto Hospital for Sick Children, an institution containing over 300 beds. It is as palatable as the finely milled cereals now so widely used and should prove a valuable addition to the diet, because of the many elements contained therein which are known to be essential for normal nutrition.—Frederick F. Tisdall, T. G. H. Drake, and Alan Brown, *Am. J. Dis. Child.*, 40: 791 (Oct.), 1930.

Commercially Prepared Infant Foods—In recent years there has appeared on the market a number of proprietary compounds for use in infant feeding. There are four groups of these commercially prepared foods and this paper describes the different groups.

The first group includes the so-called "reconstructed" baby food and is made up generally of powdered milk, cod liver oil and sugar, in addition to the milk sugar already present. These foods meet all the recognized food requirements of babies.

The second group is the so-called "milk modifier." While the milk sugar normally present in milk may be available for digestion by the baby, physicians feel that another sugar which can be assimilated quickly should be added in certain cases. For this reason, compounds have appeared on the market as "modifiers."

Another group is "protein milk." This has been designed for infants who have developed certain temporary complaints, particularly diarrhea.

The third group is "lactic acid milk." The use of this milk, which is made up of cows' milk to which has been added chemically pure lactic acid or the milk allowed by culture to develop its own lactic acid from the milk sugar, allows the baby to adjust itself to the diet of the cows' milk.

The fourth group is the powdered, evaporated and condensed milk. These brands are used by many mothers for older babies due to the conveniences of handling.

No attempt has been made in this

study to discuss the merits from a nutrition standpoint of the different brands of infant food on the market, and before adopting such infant foods, the mother should consult a physician as to the type of food essential and adapted to the particular infant.

The mother has a right to demand that these infant foods should meet the highest sanitary standards, which include the following:

1. The infant food should be produced under clean conditions and kept clean throughout its journey through the processing plant to the baby.
2. There should be no harmful bacteria present.
3. The number of bacteria present should be reduced to a minimum.

It is understood, from examination of a number of samples, that practically all of the infant foods now on the market meet these standards.—G. J. Hucker and Alice M. Hucker, *New York State Agri. Exper. Sta., Bull. 584* (Oct.), 1930.

Effect of Drying and Sulphuring on Vitamin C Content of Prunes and Apricots—There was previously reported the result of studies made on vitamin C of peaches (abstract, this JOURNAL, 19: 1053, Sept., 1929, and 20: 1362, Dec., 1930). The present paper reports the effect of drying and sulphuring on the vitamin C of prunes and apricots. The fruit was prepared as in the previous experiments. A table is given showing the composition of the fruits tested.

Guinea pigs were used as test animals and they were fed doses of the different fruit products for 60 to 90 days. At the end of the 90 days, autopsy was performed on all animals and examination made for symptoms of scurvy. The 60-day period was found to be as effective for assay of vitamin C as the 90-day period. Both the dehydrated prunes and apricots retained vitamin C more completely than did the sundried. The dehydrated and sundried apricots containing 450 to 500 or more p.p.m. of sulphur dioxid retained the antiscorbutic property more or less completely. With a less amount, this property was lost entirely. All of the unsulphured fruits whether dried or dehydrated had no antiscorbutic value.—Agnes Fay Morgan, Anna Field, and P. F. Nichols, *J. Agri. Res.*, 42: 35 (Jan. 1), 1931.

CHILD HYGIENE

RICHARD A. BOLT, M. D., DR. P. H.

IT was indicated in last month's JOURNAL that education for parenthood should really begin in our secondary schools where it can be correlated readily with home economics and science, as well as with other subjects. In the tentative report[1] prepared by the late Anna E. Richardson, Chairman of the Sub-Committee on Education for Home and Family Life, of the White House Conference on Child Health and Protection, the importance of well planned courses in these subjects is stressed. A number of progressive high schools throughout the country have already incorporated such courses in their regular curriculums. Where these can be combined with actual observation of young children, and opportunity given to assist in their care, there is every reason to believe that considerable good will result.

But such instruction in the schools is not enough. It must be continued with greater emphasis into the parental period. Courses along the line of parental education are now offered in many university extension centers, and numerous organizations, among them Parent-Teacher Associations, Federations of Women's Clubs, etc., are taking an active interest in this work. Popular magazines and newspapers are publishing articles featuring maternal and infant care.

Literature published by the U. S. Children's Bureau has reached to every corner of this country. Its pamphlet on Prenatal Care,[3] published in 1913, written originally by Mrs. Max West, and recently completely revised by an advisory committee on obstetrics, has undoubtedly had the widest circulation of any material of this type, distribution reaching into millions of homes.

The revised edition has been brought up to date and is more attractively illustrated. It is simply written, authoritative, and appeals to the interests of mothers and prospective mothers. Health officers would do well to give this prenatal educational brochure wide distribution.

The Maternity Center Association of New York, after a thoroughgoing demonstration of what can be accomplished in maternal hygiene, now proposes a new use for Mother's Day, with the practical purpose of pointing out the dangers to which motherhood is exposed, and bringing to the attention of the laity and medical profession alike the possibilities of reducing the altogether too high maternal and early infant mortality in this country.

A nation-wide campaign of educational publicity is to be conducted with emphasis upon a study of the local maternity needs, and possibilities for bettering conditions. In setting forth this program, Dwight S. Anderson[4] has the following to say:

Mother's Day—May 10—will signalize a national educational movement to direct the attention of the American people to our deplorable maternal death rate, said to be the highest in the civilized world. It is hoped to make Mother's Day this year mark the beginning of an attempt to get adequate maternity care for every expectant mother.

Mother's Day seems the opportune time to direct attention to this subject. As the appeal is planned to be entirely educational, without any features of money raising whatever, it is felt that people will welcome a constructive use of this occasion—a new Mother's Day wholly without commercialized propaganda. Endorsements were given by Surgeon General Cumming of the U. S. Public Health Service and Grace Abbott of the Children's Bureau. The coöperation of women's clubs was obtained through the endorsement of Sadie Orr Dunbar, Chairman of the Welfare Division of the General Federation of Women's Clubs.

While national publicity[4] is planned, including radio talks, news stories, as well as display advertisements and articles in magazines, trade journals and house organs, dependence for results rests principally with local clubs and health groups which are to engage in the campaign. Such organizations are to be assisted in promoting a local campaign in their own names, using ideas and suggestions which will be sent interested persons.

In order effectively to draw public attention to the need and importance of adequate maternity care, those interested in community efforts are urged, during the week or two before Mother's Day, to familiarize themselves and their professional associates with the local maternity situation; that is, the number of births, the number of doctors, the number of midwives, the number of hospital beds for maternity patients, the available nursing and home help services, the number of mothers who die having babies, the number of babies who do not live a year, the number who are born dead. How early in pregnancy do mothers come under medical care and does that care continue until the baby is 6 weeks old?

It is suggested that Mother's Day publicity efforts include:

1. Newspaper stories, concerning local and national maternity work. Interviews with a prominent obstetrician or laywoman; homely interesting items by the president of the Hospital Board or the local director of any Health or Nurses' Association.

2. Editorials. Editors of papers, whether city or country, daily or weekly, should be requested to comment editorially on the above material.

3. Proclamation from the local Health Officer should be obtained, endorsing such observance of Mother's Day as will result in improved maternity care.

4. Announcements by pastors of Mother's Day and its observance in a modern enlightened way, calling attention to whatever meeting has been planned.

5. Educational literature for mothers and fathers.

Articles, stories, advertisements, suggestions for editorial comment, and educational literature for mothers and fathers can be obtained from the Maternity Center Association, 578 Madison Avenue, New York, N. Y., free of charge.

This endeavor is to be highly commended, but it is hoped that it is just the beginning of a concerted effort to extend the routines and technics already so well worked out by the Maternity Center Association. Furthermore, it seems that here is an opportunity to give widespread publicity to the findings of the Sub-Committee on Prenatal and Maternal Care, of the White House Conference.

It would be enlightening to secure the opinions of the state bureaus of child hygiene which have sent out prenatal letters to prospective mothers in their states. These letters, in one form or another, have been widely used a decade or more, and some of the states continue to use them. Where they have been prepared with the coöperation of the local or state medical societies and used by the doctors in their private practice one would expect a noticeable amount of good to have resulted. Where these letters can be followed up by the instructions of public health nurses, and by repeated examinations by physicians, either in their own offices or in prenatal centers, the maximum good can be accomplished. Visiting nurses in some of our larger cities have already shown what can be done along these lines. Another avenue of approach which has been tried but little is the sending of one of the booklets on prenatal care to all newly married couples, the names being obtained from the marriage register clerk. This would call attention to the importance of getting in touch with a capable physician as early in pregnancy as possible. Physicians should also have a supply of simply worded pamphlets which can be given to their regular patients.

A method of prenatal instruction which has proved valuable is group instruction in the prenatal centers or in clinics where patients are waiting for the physician. This has been done in Cleveland for the past 4 years in connection with the Maternity Hospital and its 7 prenatal centers, and in 3 of the other hospitals. An experienced and well trained public health nurse is employed to conduct the classes in the various centers. She early prepares a set of lesson sheets on the most important points in prenatal care, which the physicians connected with the hospitals approve before they are put into use. Her method is a simple direct approach to practical every-day problems and answering any questions which arise. This work is supplemented by group instruction, conducted by a trained nutritionist who carries out actual demonstrations in preparing suitable foods. It not only occupies the time which might otherwise be taken up by gossip among the patients, but gives them useful suggestions and educates them to appreciate the value of good prenatal care. During the past year over 3,000 mothers and prospective mothers were reached by this group instruction, and of this number only 1 maternal death occurred. This type of instruction, coupled with visual education in the waiting room, should do much to make the physician's work easier and result in better follow-up on part of physician and nurse.

Every hospital which accepts maternity cases should make ample provision for thorough prenatal service. This is relatively easy for the exclusively maternity hospitals, with a closed staff,

especially when under university auspices. But it is much more difficult where the maternity work is simply part of a general hospital service, and open staff arrangements prevail. Here it is difficult to standardize the routines and to get the individual physician's patients under proper prenatal care early enough in pregnancy. We should strive to bring about the organization of a prenatal service in such hospitals, however, as an extension of the regular nursing and social service departments.

It is enlightening to study intimately the results of obstetric service in a number of the hospitals of a large city. One is immediately struck with the great difference in maternal and early infant mortality rates in the different hospitals. While the causes back of this may be complex, in many instances it is readily discernible that the hospitals making ample provision for careful prenatal care and instruction, and having a proper control over obstetric routines, exhibit the lowest mortality. If the local health authorities should compile each year a list of local hospitals showing the number of obstetric beds in each, the total live births, stillbirths, and deaths under 2 weeks, together with the maternal deaths, it would afford a basis for comparison which would be very salutary and indicate places where improvements could be made.

Advantage should be taken of every occasion to bring before the whole community the problems of maternity and infancy. For the past few years Child Health Day—May Day—has afforded such an opportunity. This has been taken advantage of in a number of states. Among those which have carried on consistent and widespread health education Indiana ranks high. Last year Indiana had a well planned program for Child Health Day, with radio talks and a general meeting attended by representatives of all the health interests of Indianapolis. This year plans are already under way for the May Day celebration. A very attractive mimeographed program[5] has been prepared which contains definite suggestions as to how this day can be used throughout the state for educational purposes.

The *Eighteenth Annual Report of the Chief of the Children's Bureau* is replete with information relating to the work of the bureau for the year ending June 30, 1930. It discusses the final work in connection with the administration of the Maternity and Infancy Act of 1921 and reviews pending legislation for maternity and infancy. The Senate Bill Number S. 255, which it mentions, was amended by the House Committee on Interstate and Foreign Commerce[6] to provide for a county health unit organization to promote general health measures as well as for a special maternal and child health program. The amended bill was reported favorably out of Committee and passed the House of Representatives a few days before adjournment. It was placed on the Senate Calendar for action but failed to pass on account of a filibuster which developed in the closing hours of Congress. The proponents of the bill undoubtedly will revive it in the new Congress which meets next December.

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3. Special statement prepared for the *A. J. P. H.*
4. See educational material prepared by the Maternity Center Association, 576 Madison Avenue, New York, N. Y.
5. *May Day—Child Health Day—Helps Meet the Challenge of the Children's Charter*, Indiana State Board of Health, Child Hygiene Division; prepared by Dr. Ada E. Schweitzer.
6. Hearing before the Committee on Interstate and Foreign Commerce, House of Representatives, 71st Congress, Third Session on S. 255 and H.R. 12,995; Jan. 20, 21, and 22, 1931; U. S. Government Printing Office, 1931.

PUBLIC HEALTH NURSING

EVA F. MACDOUGALL, R. N.*

Public Health Nursing in Alberta and Saskatchewan—Public health nurses are employed in three rural municipalities in Alberta. Half their salaries are paid by the municipalities, half by the Province. One nurse demonstrates home nursing and first aid at the request of local organizations and is in great demand. Child welfare stations in Calgary, Edmonton and Medicine Hat are in charge of public health nurses.

Seven district nurses are stationed in frontier communities, mostly in the northern part of the Province where there are no medical or hospital facilities of any kind available. These nurses are very carefully selected and are required to have special obstetrical training. They provide special service in midwifery, bedside nursing, child hygiene, first aid and the like.

In the summer several public health nurses travel through the Province with a Travelling Child Welfare Clinic. Local physicians are invited to coöperate in the conferences arranged by local organizations. These conferences are attended mostly by preschool children who are weighed, measured and inspected, and mothers are advised with reference to diet and correction of defects.

In Saskatchewan the Victorian Order of Nurses has placed one of its nurses in each of three rural districts as an experiment. They do bedside nursing similar to that done in urban centers. The Victorian Order pays their salaries and supervises their work; each municipality gives a grant to the V. O. N. and patients pay a nominal fee when they can. Each nurse is supplied with a car by the Department of Health. The hope is that when a demonstration has been made the municipalities will carry on the work entirely at their own expense.

There are 14 government nurses located in various parts of the Province. One of these nurses serves all maternity cases in one municipality at the expense of the local municipal government, and in a period of 6 years there were 185 births and no maternal deaths. In the same period the infant mortality was 48.7, and not one death from a communicable disease occurred.

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Another New Course in Public Health Nursing—A Department of Public Health Nursing was opened at Syracuse University in February, 1931. Ellen L. Buell, R.N., formerly Educational Director of the Henry Street Visiting Nurse Service, New York, N. Y., is director.

The length of the course is approximately one college year and one summer session totalling 36 credit hours. A certificate of Public Health Nursing is to be granted by the College of Medicine of the University. If nurses are interested they may write to Miss Buell for the bulletin describing the courses of study.—Abstracts from Preliminary Announcement of Course.

* Please send printed matter or other material relating to public health nursing to Eva F. MacDougall, 6 State House Annex, Indianapolis, Ind.

Measles Conference—Public health nurses joined health officers, representatives from the State Charities Aid Association, the State Medical Society and other organizations in a general conference on measles in Albany in January, arranged by the New York State Department of Health.

The conference conceded that measles cannot be prevented but that much can be done to decrease the number of complications which often prove fatal. The following important facts were emphasized:

1. The disease should be postponed until after the 3d and better until after the 5th birthday.
2. Adequate medical, nursing, and hygienic care are the most important means of preventing complications and a fatal outcome.
3. The disease is particularly fatal among undernourished and underprivileged children, and unusual methods of control must be applied to prevent or ameliorate the disease in such children.

The conference agreed that public health nurses could best be used in preventing measles:

1. By discovering other unreported cases of children who have been exposed and whose families have not been instructed.
2. By instructing families how to make the best use of available facilities. This should extend to actually demonstrating how to prevent complications through the isolation of the case, choosing the right room, securing proper ventilation and adequate light, cleanliness and orderliness of surroundings, and care of the patient.—

Health News, New York State Dept. of Health, VIII, 5: 19, 20 (Feb. 2), 1931.

More about the Health Officer and the Public Health Nurse—There may be several groups of public health nurses working in a community, one employed by the board of health, another by the visiting nurse association, and the other by the school health department, but if each nurse looks upon herself as a part of a larger group working for the whole community there will be no trouble in defining what the relationship should be of the different groups to each other and to the health department.

If there are two or more groups of nurses of this kind, however, it is important that they meet together frequently to talk over their problems and become familiar with each other's work. In these meetings also definite plans for special health education programs can be worked out. *All* the nurses as they visit homes can be on the alert for suspicious cases of tuberculosis, communicable diseases, cancer, etc. Even helpful advice about sunshine and cod liver oil in the prevention of rickets can be given mothers instead of leaving it all for the infant welfare nurses.

Dr. Denny says:

> The first thing to do is to decide on what special phases of health work to concentrate. There probably should not be more than three or four different lines of health propaganda to be carried on at any one time and these might be changed from time to time. These could best be decided on by the whole nursing group in conference with the health officer and others familiar with conditions in that community and would vary in different places.
>
> At the present time it would be wise almost everywhere to work at diphtheria immunization. If this were to be done, I would suggest some such procedure as this: Each and every nurse on her visits should inquire whether all the children have been protected. If they have been, a word of commendation is in order. If they have not been, and there is a marked attitude of hostility, it is probably best at first not to say much more than enough to show that the nurse and the organization she represents think favorably of it. Above all, the nurse should not start an argument and force the parent to take a position she will continue to try to defend. At the next visit tell how many children have been treated at the school her children attend or at the nearby health center. Most people hate to be with the minority. They follow like sheep what most of the flock are doing. At a subsequent visit, if still resistant, it is well to speak of some definite case of diphtheria, preferably in the neighborhood, and some family that the mother knows about, where the parents had been meaning to protect the child but had neglected to do so and

now are full of regrets. It is very uncomfortable for us parents to think how we are going to feel if our child gets a serious disease which we might have prevented.

A carefully planned procedure like this just outlined gradually overcomes what is called in the commercial world "the sales resistance" and you finally sell your proposition. The important thing is not to fire all your guns at once but by subtle repetition and by different methods of approach gradually to get the lesson across. With all the nurses in the community, working at the same time for the same object, I am convinced that an astonishing amount could be accomplished.—

Francis P. Denny, M.D., The Relationship of the Nurse to the Health Officer Group, *The Commonwealth,* Massachusetts Dept. of Health, 17, 4: 175–177 (Oct.–Nov.–Dec.), 1930.

Walter Burns Saunders Memorial Medal—The second award of the Walter Burns Saunders Memorial Medal for an outstanding service to nursing will be made this year. At the biennial convention of 1930 the first medal was awarded posthumously to S. Lillian Clayton, former President of the American Nurses Association.

Distinguished for Service in the Cause of Nursing—These words below the name of the recipient mark this medal which is given by W. L. Saunders II, of Philadelphia, in memory of his father, William Burns Saunders.

The recipient to whom the reward will be made must be a member of the American Nurses Association, who has made to the profession or to the public some outstanding contribution either in personal service or in the discovery of some nursing technic that may be to the advantage of the patient and to the profession. The only kind of service excluded is that of writing.

Recommendations should be submitted to the Headquarters of the American Nurses Association, 370 Seventh Avenue, New York, N. Y., before April 6, 1931.—Walter Burns Saunders Memorial Medal, American Nurses Association Release, Jan., 1931.

The French and German of It—As nursing activities have developed in the different countries of the world, much confusion has ensued because each country had a different term for the same worker or type of work. Consequently the Nursing Division of the League of Red Cross Societies in collaboration with the International Council of Nurses, after studying the idioms most commonly used, and classifying them, have thus recommended the French and German translations for many hospitals, nursing and social work terms. We are giving four of these terms which might be of particular interest to public health nurses:

French	*German*
Social Worker	
Assistante sociale; travailleuse sociale; auxiliaire sociale	Fürsorgerin, Sozialarbeiterin
Trained (General) Nurse (Graduate Nurse)	
Infirmière diplômée	Staatlich anerkannte Krankenpflegerin; ausgebildete Krankenpflegerin; geprüfte Krankenpflegerin; ausgebildete Schwester
District Nurse	
Infirmière visiteuse	Gemeindeschwester
Public Health Nurse	
Infirmière visiteuse; infirmière d'hygiène sociale	Wohlfahrtspflegerin; Fürsorgeschwester

Nursing Phraseology, *Information Bull.,* League of Red Cross Societies, IX, 11–12: 344 (Nov.–Dec.), 1930.

EDUCATION AND PUBLICITY

EVART G. ROUTZAHN*

Suggestions Invited—"What Everyone Should Know About Cancer," the well done booklet of the American Society for the Control of Cancer, 25 W. 43d St., New York, N. Y., is about to be reissued. There are few high-brow words in it. Can you find one which should be changed? Do you question any statement? Any suggestions to offer Dr. R. V. Brokaw, executive secretary? A copy of the booklet will be sent free upon request.

How About It?—In neighborhoods where there is considerable unemployment could health agencies experiment with "health entertainment" programs? Movies, slides, very brief talks, questions and answers, plays, music? A vacant store? Use volunteers.

Make a fresh attack upon diet at this time?

Tackle "worry"? Boost recreation possibilities?

Try to help present conditions—*and get some of your own job done?*

1931 Publicity Awards—As announced by Social Work Publicity Council, 130 E. 22d St., New York, N. Y., the following will be considered: annual reports, envelope stuffers, house organs for the public, staff house organs, industrial posters, published educational photographs, social case work stories, suburban publicity. Closes April 15, 1931. Many of past awards have gone to health organizations. Any member of S. W. P. Council will have full details.

A New National Medium—"Keeping Up With the World!" is a new department in *Collier's Weekly,* 250 Park Ave., New York, N. Y.—a weekly column made of paragraphs—fact, figures, fancy. Plenty of items possible from the health field, and $1 is paid for each one accepted.

When It Is New—Then is when the editor wishes to see specimens of all types of your publicity. Will you send samples upon request? Free? For how much postage? Sale price? See editor's address at bottom of this page.

The Research Spirit in Health Education—The following is quoted by *Hygeia* from the committee on research in education of the American Association for the Advancement of Science:

> We believe that every normal individual is born with some endowment of the research spirit . . . that this mental habit of learning by self-reliant experiment should be conserved and strengthened from the beginning throughout life.

Is not the questioning, testing, observing attitude—the learning attitude—of immense importance to those who seek to change health habits? Some of the health bulletins do not seem to have changed in all the 10 to 20 years they have been reaching me. Even the paper or type remains the same—and in some cases it is atrocious.

The A. A. A. S. report continues:

> We believe that all education from prekindergarten age on through the university should have this encouragement of the spirit and habit of research as a main object. . . .

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

We believe that teaching should be conducted only by those who have the research attitude themselves and have ability to cultivate it in their pupils.

This seems to be addressed not only to the teachers in schools but also to the teachers who use the newspaper, the lantern slide and other mediums. You will want to read "The Scientific Mind" in *Hygeia*, Feb., 1931.

Not What It Once Was—Did you read *Hygeia* once upon a time and did you give it up because it lacked many of the elements of a successful popular health magazine? Then you should look over some 1931 issues. The range of the illustrations has a wide appeal beyond the health content of the articles. Titles and text grow better and better. The armor-plate paper was abandoned long ago. The advertisements look interesting and many of them are good reading. But see for yourself. The American Medical Association is to be congratulated for its faith and persistence in the face of many difficulties.

SCHOOLS AND CHILDREN

This department looks forward to the time when there will be adequate provision in the *Journal* for the interests of schools and teachers in the health field. Likewise in the annual meeting. Neither the Public Health Education Section nor the "Education and Publicity" department of the *Journal* should be depended upon for a halting recognition of this vital place of the health movement. Will not some one get this idea before the powers that control our destinies?

If you are concerned with health in the school you read *Hygeia* as a matter of course. So far as we know no other periodical department carries so much of value to the teacher and the health worker. Along with this should go *Child Health Bulletin* (American Child Health Assn.), which serves a partly different service. It is not possible in this department to call attention to the particular issues of these periodicals—and it should not be necessary.

Frequent articles on classroom teaching or reports of experiments: *Public Health*, Michigan Dept. of Health, Lansing; *Public Health Nurse*, 450 7th Ave., New York, N. Y.; *Red Cross Courier*, Washington, D. C. *Samples free.*

Material for classroom teaching in: *The Crusader*, Wisconsin Anti-Tuberculosis Assn., Milwaukee; *School Health*, Tuberculosis and Health Society, Detroit; *Child Health*, Oregon Tuberculosis Assn., Portland; *Safety Education*, National Safety Council, 1 Park Ave., New York, N. Y. *Samples free.*

The Feb., 1931, issue of *Journal of the National Education Assn.*, Washington, D. C., contained the 36th article of the series on mental hygiene.

Says a mailing card addressed to physicians:

A health certificate is required of every child entering school. Seven out of 10 need medical care. Take your child to your physician *now* for examination and treatment.

The above is a reproduction of a car card put out by Brooklyn Tuberculosis and Health Assn., 293 Schermerhorn St. On the address side one-half of space is given to a letter from the president of Medical Society of County of Kings. The card is 6" x 9".

"Making a School Movie." *Cleanliness Journal*, Cleanliness Institute, 45 E. 17th St., New York, N. Y. *Free.* Making a "movie" (in any school or club) without photography or projection machine. A device good for exhibits—as made by children or adults.

"Teaching School Children Health: How Best to Reach Boys and Girls in Different Age Groups," by Dr. Iago Galdston. *Everybody's Health*, St.

Paul, Minn. Feb., 1931. *10 cents.* A brief statement of first considerations.

The *Missouri Public Health News* (State Board of Health, Sept., 1930) reports on the Blue Ribbon Baby Health Contest conducted at the State Fair. There were classes for rural and town boys and girls—12 to 24 months, 24 to 36 months, 36 to 48 months.

An educational program addressed to junior and senior high schools is being launched by the American Eugenics Society. Address them at New Haven, Conn.

Health in High Schools—a symposium. National Tuberculosis Assn., 450 7th Ave., New York, N. Y. For everyone concerned with high school health. 40 pp. *5 cents.*

Teacher's Inventory of Health Assets. National Tuberculosis Assn. Questions on "The Schoolroom," "The Community" and "The Pupils," with "Progress Chart." "Given as examples of what the teacher should ask in order to know whether her health teaching is carrying over into practice in the schoolroom, the home and the community." Likewise a tool for parent-teacher associations, home bureau workers and others who wish to check back from the community to the school. *75 cents for 100.*

"Health—the first objective in Education." Welfare Division, Metropolitan Life Ins. Co., New York, N. Y. Classified list of publications issued by School Health Bureau.

You Have An Square A Lunch—Why? National Dairy Council, 221 N. LaSalle St., Chicago, Ill. 16 pages. A study of classroom-lunchroom health teaching directed by Dr. Lydia J. Roberts, University of Chicago. *Free.* Supplemented by teaching material. *50 cents a set.*

Health Bulletin for Teachers. Issues for April, 1929–June, 1930, combined. Metropolitan Life Ins. Co., New York, N. Y. Addresses of publishers and prices are not given with reading references.

The Health and Cleanliness Chronicle of a Junior High Training School. 30 pages. Dull finished paper. *Free for Junior High Schools.*

"No satisfactory text available" on health education says "A Curriculum for the Professional Preparation of Physical Education for Secondary Schools." In the list of reading references *no prices are given* and the *number of pages is not shown.* A regrettable omission. From California State Dept. of Education.

Health and Physical Education Series—Grades I to III. Ohio Dept. of Education. Foot note and reading lists are uneven, *but the majority give the city as well as the publisher.* Prices for 2 groups of pamphlets. The following is significant:

> Commercial advertising material may be secured for health teaching. Care should be exercised that it be attractive and true to fact. Circulars and pamphlets containing a minimum amount of good health material and a maximum amount of advertising should be avoided. Schools cannot afford to be used for commercial advertising purposes.
>
> Cleveland schools are not allowed to use health advertising material without special permission from the board of education. In Dayton such material may be used for classroom purposes although it may not be distributed to the children to take home.

HONORABLE MENTION

To the Commonwealth Fund: for Annual Report for 1930—for the aquatone illustrations, type, paper, and table of contents (the last is difficult to find because it does not follow the title page).

To St. John's Guild (floating and seaside hospitals): for Annual Report with table of contents—with committees and officers listed on 3d and 4th cover pages *as indicated in table of contents*—with pages of half-tones scattered through the many pages listing donors and contributors. New York, N. Y.

RADIO

"The Level of Thirteen-Year-Olds," by William Orton. *Atlantic*. Jan., 1931. "What broadcasting is and might be."

The *New York World* gives the credit to radio:

> It has shortened the speeches that the citizenry has to endure. Time was when the chief orator at a public gathering took from forty minutes to an hour and a half to reveal that he had nothing to say; the fact probably had a lot to do with the mounting death rate from nervous diseases. But the radio has changed this. . . . There has been a great deal of condensation, and particularly a mortality among the comical Scots, Jews and Irishmen brought to mind by the opening remarks of the toastmaster. . . . Also, there has been a diminution in the water-drinking, coat-buttoning and for-reply-pausing that used to be such a trial on the patience.

V. W. Marr, chairman of Radio Committee, Publicity Group of Boston Council of Social Agencies, offers the following advice to broadcasters:

> To arrive late at the studio is one of the most serious offenses in the radio world. Until the arrival of assigned performers, the program manager is sitting on needles and pins wondering whether the scheduled talent is to arrive. Consequently, all broadcasters are requested to be at the studio at least one-half hour before the time scheduled for their broadcast. They should report immediately to the person in charge of the studio.
>
> Another matter of equal import is overtime. Any person who runs over his allotted time in a broadcasting studio is an unwelcome visitor and his chances of further performances are slight. He not only cooks his own goose, but, in the case of a series, jeopardizes the chance of others to obtain the facilities of the station gratuitously.
>
> It appears that too many of the agencies are submitting stereotyped articles with the assumption that the radio audience is, or will become, interested in their cause. Consequently, agencies are urged to bear in mind the slogan "Entertain and Interest."

The Heart Council of the Cincinnati Public Health Federation reports 500 requests from 33 states for pamphlet copies of radio talks.

Connecticut State Dept. of Health reports a radio listener who was led to substitute a visit to a physician for a dose of salts. The listener was hurried to a hospital for an acute appendicitis operation.

Philadelphia Dept. of Health broadcasts over WFI every Tuesday at 6:45 p.m.

"Devils, Drugs and Doctors," a 15-minute broadcast by Dr. H. W. Haggard, sponsored by Eastman Kodak Co., over Columbia System, Sundays: 8:00 p.m. (E. S. T.), 7:00 p.m. (S. C. T.), 6:00 p.m. (M. S. T.), 5:00 p.m. (P. S. T.). Printed copies free.

The Canadian Social Hygiene Council, Toronto, Can., supplies a series of 30 radio talks on various health topics to 16 stations for local broadcasting. Copies may be secured from the Council.

Copies of radio talks may be secured from State Dept. of Health, Hartford, Conn.; State Board of Health, Raleigh, N. C.; Ohio Public Health Assn., Columbus, O.; Bureau of Health, Rochester, N. Y.; U. S. Public Health Service, Washington, D. C.; Cleanliness Institute, 45 East 17th St., New York, N. Y.

On Feb. 4 was given the 82d of the radio talks on "Your Health" broadcast Wednesday afternoons over WEAF by Dr. Shirley W. Wynne, 505 Pearl St., New York, N. Y., who will supply copies on request.

Whenever the 100th broadcast is reached by the New York State Dept. of Health the series is printed in a neat paper bound volume numbering about 125 pages. The fourth volume of *Health By Radio* has appeared. Many of these talks can be taken over by other states and cities with slight changes.

EDUCATIONAL MATERIAL

Prenatal Care. Children's Bureau, Washington, D. C. Revised "best seller."

Carbon monoxide booklet—both French and English. Provincial Bureau of Health, Montreal, Can.

Management of Cases of Communicable Diseases in Isolation or Quarantine. State Department of Health, Des Moines, Ia. Not at all "official" looking. Heavy paper. Simple line cuts. Need not have used the shiny paper. *Free.*

Sex Education, by Edith D. Dixon. Extension Service, Rutgers University, New Brunswick, N. J. 8 pages. Seeks to bring about "a matter-of-fact attitude" and use of "the correct vocabulary." The few reading references all include publisher's address and price. For free distribution only in New Jersey, but single copies will be sent free to health workers elsewhere. Request privilege of re-publication.

The Early Care of Children's Teeth, by Dr. L. J. Stephan. Milwaukee Health Dept. 12 pages. From birth to 6 years. *Free.*

Some day this writer hopes for careful consideration of how to select subject matter for those who most need health information. Should the early care of children's teeth be presented in two parts? How about using "Save The Baby Teeth!" for the mothers of babies?

List of Publications, National Committee for Mental Hygiene, 450 7th Ave., New York, N. Y.

Some of the advance papers of the International Congress on Mental Hygiene are available at *15 cents* a copy. Ask for copy of list. Two of them: Educational Techniques for Mental Hygiene Societies, and Public Education in Mental Hygiene.

Publicity Material. American Society for the Control of Cancer, 25 West 43d St., New York, N. Y. *Free.* A list of available material.

Children's Bureau and Other Publications Relating to Children. Supt. of Documents, Washington, D. C. *Free.* List of government publications for sale.

Foods and Cooking. Supt. of Documents, Washington, D. C. *Free.* List of government publications.

Living The Healthy Life, by Dr. J. F. Williams of Teachers College. John Hancock Mutual Life Ins. Co., Boston, Mass. *Free.* A "health manual" of 12 pages for those who will accept a manual touching upon a dozen aspects of healthy living.

Health Education Material. Dairymen's League Coöperative Assn., 11 West 42d St., New York, N. Y. *Free.* Illustrated catalogue of publications and other material.

Publications and Policy of Distribution. Cleanliness Institute, 45 East 17th St., New York, N. Y. *Free.* Classified, descriptive list of publications and how to get them.

Among the Cleanliness Institute publications: The Great East Gate, by Dr. W. W. Peter, and Hitch-hikers, by Dr. Peter and G. T. Hallock. All health educators may and should have copies. When you have read or used either of them please tell me what you think of it. Hitch-hikers offers many ideas for exhibits and illustrated talks.

Eating for Efficiency. Evaporated Milk Assn., 203 North Wabash Ave., Chicago, Ill. 64 pages. Menus, recipes, calories and mineral values of common measures of food. *Free.*

Health Education and the School Lunch, and Why Evaporated Milk? illustrate use of rough finished paper, silhouettes as illustrations, and black with one color in printing. Address above. *Free.*

Citrus Fruit Recipes For Special Diets. California Fruit Growers Exchange, Los Angeles. *Free* for training classes.

MAGAZINE ARTICLES

"The Gland Route to Health," by Dr. G. F. Alsop. *Woman's Journal,* New York, N. Y. Dec., 1930.

"I Smell Smoke," by T. F. Dougherty. *Saturday Evening Post.* Jan. 31, 1931. Fire hazards and prevention.

"What Rights Has the Child?" by Dr. W. R. Ramsey. *Farmer's Wife.* Feb., 1931. St. Paul, Minn. *Free.*

"Our Ageing Population: Its Vital Effects," by Louis I. Dublin. *New York Times.* Jan. 4, 1931. Diagram.

CONVENTIONS

"Public Health Education—The Function of the University and of Private Foundations—The Functions and Limitations of Government in Public Health" will be discussed by the Health Division, National Conference of Social Work, Minneapolis, Minn., June 19, 1931.

The Educational Publicity Division, National Conference of Social Work, Minneapolis, Minn., will discuss: "Education of the Public on Mental Hygiene—The Public Mind on the Private Mind"; "Lessons in Public Relations from the Year 1930—Old and New Stereotypes"; "The Child and Propaganda—The Conundrum of the Educator—The Problem for Child Guidance"; "The Lessons From Difficult Causes"; "The Radio and Social Work—Does the Public Listen In?—Who is Broadcasting—and What?"

At Minneapolis in June the Social Work Publicity Council program will include: "Review of 1931 Publicity Awards"; "Round Table on the Newspaper in Social Work"; "Outstanding Publicity Ideas of the Year"; "What's On Your Mind: Questions and Answers on Publicity Practice"; "Round Table on Annual Reports and Annual Meetings."

"A School Health Program in Relation to Tuberculosis of Children," by D. J. Kelly, and "Public Relations," by G. A. Hastings, will be features of the National Tuberculosis Association convention, Syracuse, N. Y., in May.

An evening session of the Pennsylvania Tuberculosis Society annual meeting was devoted to "Education for Health." One of the 3 addresses was by Dr. H. E. Kleinschmidt of the Public Health Education Section. Another feature was a joint luncheon session with the local Rotary Club.

The White House Conference will be discussed in an afternoon session of the annual meeting of the Iowa Public Health Assn.

Report of Magazine Coöperation With White House Conference. Mimeographed report showing an immense circulation of Conference material. Professional journals do not show up so well, due, doubtless, to the scarcity of real fact material about the Conference. Most of the news releases told of conditions and problems, while public health workers needed to know more about the plans for the studies and the Conference.

DATES AHEAD

May 1—Child Health Day—Emphasis upon "an adequate school health program adapted to meet the needs of each community," and the "support of adequate full-time community health service," are urged as May Day—Child Health Day—themes by the Conference of State and Provincial Health Authorities. Address: American Child Health Assn., 450 7th Ave., New York, N. Y.

May 10—Mother's Day—Address: Maternity Center Assn., 578 Madison Ave., New York, N. Y. "A Day to Save Mothers' Lives"; "to direct the attention of the American people to our deplorable maternal death rate—the highest in any civilized country." 8 electrotypes, in different sizes, for newspaper use supplied free. Also press copy, 400 up to 1,200 words, including: "The Waste In Mothers' Lives"; "They Never Knew Their Mothers"; "A Square Deal for Mothers"; "Stork Worship." Other forms of publicity suggested for state and local groups.

Departments and associations may "cash in" on the national promotion of the "Day" under the leadership of the well known Maternity Center Association.

May 12—National Hospital Day—Address: National Hospital Day Committee, 537 S. Dearborn St., Chicago, Ill. Some of "the larger radio and national advertisers have promised cooperation." This of course is a long established and successful event.

WHY DO THEY DO IT?

A memorandum of health activities in a city, located east or west of Montauk Point, is headed

A Review of New Activities initiated or accomplished at . . . during the past ten months.

But the memorandum is not dated! Nothing but a real letter is dated—according to the average stenographic mind. The way to avoid trouble in filing and sending out undated material is to have an office rule that *all material* going through a typewriter shall be dated *unless* contrary instructions are issued.

A 4-page T.A.T. folder of special merit is issued by "the Health Department" in some unnamed city. Why the modesty?

PLAYS

A play for adults: My Son John, by Drs. L. F. Wooley and D. K. Pratt. National Committee for Mental Hygiene, 450 7th Ave., New York, N. Y. *10 cents.* "A mental hygiene playlet about a normal child." First presented at annual meeting of National Congress of Parents and Teachers.

The Treasure of Healthy Harbor. *Hygeia*, 535 North Dearborn St., Chicago, Ill. Feb., 1931. *25 cents.* Another "pirate" health play for the 7th grade.

"Let's Give a Play," by O. Schrottky. *American Girl*, 670 Lexington Ave., New York, N. Y. Feb., 1931. *20 cents.* Makes much of simple settings and costumes—to make it easier to "give a play" about health—or for health's sake.

In the same issue of *American Girl*, the Girl Scout magazine, will be found "Plays to Act and Read," by S. L. Goldsmith, and "How About Marionettes?" The latter introduces the idea of home-made puppets.

DIPHTHERIA

"The Results of the 5-Year Toxin-Antitoxin Campaign" (now closed) in New York State. State Dept. of Health, Albany. *Free.*

The "Diphtheria issue" of *The Commonhealth* (Massachusetts Dept. of Public Health) included "A Diphtheria Immunization Campaign—Organization and Methods." July–Sept., 1930. *Free.*

Emphasis for the 24-sheet diphtheria prevention poster was gained in Lafayette High School, Buffalo, by an unveiling in the school auditorium. Illustrated in *S. C. A. A. News*, 105 East 22d St., New York, N. Y. Jan., 1931.

A progress report of the New York City campaign based on "the economic loss caused by diphtheria"—a press release. New York City Dept. of Health. *Free.* Can be worked over in other cities or states.

Two different blotters and a small handbill—Health Dept., Attleboro, Mass. No "hard words." Tell the 3 or 4 facts most necessary to get understood. *Free.*

A press release on diphtheria carriers—New York City Dept. of Health. *Free.* Also "Eight children's lives saved each week"—press release. *Free.*

The Berwyn, Ill., American Legion Post was awarded the State Adjutant's Cup—"for the outstanding piece of service among the children in Illinois"—for its local campaign for diphtheria immunization.

BOOKS AND REPORTS

USEFUL BOOKS OF THE PAST YEAR

MAZÝCK P. RAVENEL, M. D.

IN this review we have not confined ourselves entirely to 1930, since several exceptional books dated 1929 were published late in the year and notices of them did not appear until 1930. Further, we omitted our 1929 annual review. We have limited ourselves almost entirely to books which will be of use to the public health worker in the many fields embraced under that title.

The classification has been somewhat difficult and under "miscellaneous," especially, will be found a number of works which might well be placed elsewhere. Works on bacteriology which include immunity, as practically all of them do, have been included under bacteriology.

While we have depended chiefly on reviews in our own columns, we have also consulted a number of leading American and English journals. Practically all the English publishers have agencies in America, some of which put out the books under their own names, so that they may be obtained as easily as those published here.

On bacteriology, we have three works of unusual value. The Medical Research Council of England is publishing *A System of Bacteriology in Relation to Medicine*, written by many authors, and published by His Majesty's Stationery Office. Several volumes have appeared during the year. For succinctness and accuracy of statement, as well as practical value, this is easily the most valuable work on this subject in the English language. Of equal value, as far as it goes, is *The Principles of Bacteriology and Immunity*, by Topley and Wilson, William Wood. An excellent book on a subject too little known is *Molds, Yeasts and Actinomyces*, by A. T. Henrici, Wiley. The Pickett-Thompson Research Laboratories have issued Volumes V and VI on the *Pathogenic Streptococci*. Volumes II and III of *Physiology and Biochemistry of Bacteria*, by R. E. Buchanan and Ellis I. Fulmer, Williams and Wilkins, are important and of great interest. Very useful books are *A Compilation of Culture Media for the Cultivation of Microorganisms*, by Max Levine and H. W. Schoenlein, Williams and Wilkins, and *Bacterial Metabolism*, by Marjory Stephenson, Longmans, Green & Co. *The Bacteriophage and Its Clinical Application*, by F. D. d'Herelle, Charles C. Thomas, treats of a much discussed phenomenon. *An Introduction to Malariology*, by Mark F. Boyd, a master of the subject, Harvard University Press, is worthy of especial praise from every standpoint, and *The Geographical Distribution of the Malaria Carrying Mosquitoes*, by H. W. Kumm, *American Journal of Hygiene*, goes with it appropriately.

Immunology has, as usual, held the interest of laboratory workers as well as clinical men. The following can be recommended: *The Chemical Aspects of Immunology*, by H. Gideon Wells, Chemical Catalogue Company; *The Immunology of Parasitic Infections*, by William H. Taliaferro, Century Company; and *Immunity in Infectious Diseases*, by Besredka, Williams and Wilkins.

The laboratory worker will welcome

the third edition of *Laboratory Methods of the United States Army,* by Charles F. Craig, Lea & Febiger; and the 7th edition of *Lehmann's Medical Hand Atlases—Determinative Bacteriology,* Volume I, Translated by R. S. Breed, G. E. Stechert. *Laboratory Medicine,* by Daniel Nicholson, Lea & Febiger, is an excellent work, and though designed chiefly for clinical medicine, contains much of value to the public health worker. *The Report of Second Conference on the Sero-Diagnosis of Syphilis,* World Peace Foundation, is also of great practical importance.

Two outstanding books on water supply and sewage disposal have appeared: *Water Supply Engineering,* by Babbitt and Doland, McGraw-Hill; and *Sewerage and Sewage Disposal,* by Metcalf and Eddy, McGraw-Hill.

The output on personal, industrial, mental, sex and general hygiene has been large. Under this general heading we have included some books which might well have been placed elsewhere, because while their titles do not indicate that they are particularly devoted to hygiene, the authors have given much attention to prevention. The following have been selected as typical in their respective lines: *The Diagnosis of Health,* by William R. P. Emerson, Appleton; *The Hygiene of the School Child,* by Terman and Almack, Houghton Mifflin; *Hygiene for Nurses,* by Guy and Linklater, Wood; *Outline of Preventive Medicine,* Edited for New York Academy of Medicine, by Sondern, Heyd and Corwin, Hoeber; *A Textbook of Hygiene,* by J. R. Currie, Wood; *Military Preventive Medicine,* by George C. Dunham, *Army Medical Bulletin No. 23; Personal Hygiene for Nurses,* by Seneca Egbert, Davis; *The Principles and Practice of Hygiene,* by Smiley, Gould and Melby, Macmillan; *Artificial Sunlight—Combining Radiation for Health with Light for Vision,* by M. Luckiesh, Van Nostrand; *Tuberculosis Among Children,* by J. A. Myers, Thomas; *Personal and Community Hygiene,* by C. E. Turner, Mosby.

Under industrial hygiene we have *Psychology and Industrial Efficiency,* by Harold Ernest Burtt, Appleton; *Incapacity or Disablement in Its Medical Aspects,* by E. M. Brockbank, H. K. Lewis; *Trauma, Disease Compensation —A Handbook of their Medico-Legal Relations,* by A. J. Fraser, F. A. Davis; *Is It Safe to Work? A Study of Industrial Accidents,* by Edison L. Bowers, Houghton Mifflin; and *The Human Factor in Industry,* by E. P. Cathcart, Oxford University Press. A new departure, useful to the laboratory man as well as the specialist in industrial hygiene, is *Industrial Microbiology,* by Smyth and Obold, Williams and Wilkins. There has been a great development in this subject since the World War, much of the material still being found only in technical journals.

Writers on sex hygiene have given us *Factors in the Sex Life of Twenty-two Hundred Women,* by Katherine Bement Davis, Harper; and *Sterilization for Human Betterment,* by Gosney & Popenoe, Macmillan.

On mental hygiene we cannot but single out *Introduction to Mental Hygiene,* by Groves and Blanchard, Henry Holt. This is a subject too little understood by the general physician and many books concerning it are written in language difficult for the average person to understand. This particular work has not only been very highly praised by specialists, but is written in language which makes all of its teachings available to the average reader. Other excellent books on this subject are: *Practical Psychology and Psychiatry,* 6th edition, by C. B. Burr, Davis; *Social Control of the Mentally Deficient,*

by Stanley P. Davies, Crowell; *The Adolescent: His Conflicts and Escapes,* by Schwab & Veeder, Appleton; and *Mental Deficiency,* 5th edition, by A. F. Fredgold, Wood.

In spite of the attention which oral hygiene has attracted for several years, as evidenced by the work in England, and the studies in America, some of which are under the Foundations, few books have appeared on the subject. We can recommend *Mouth Infections and Their Relation to Systemic Diseases,* by Malcolm Graeme MacNevin and Harold Stearns Vaughan, issued by the Joseph Purcell Research Memorial. From England we have a most valuable report, *Special Report Series, No. 140, Diet and the Teeth: An Experimental Study,* Part I, by May Mellanby; His Majesty's Stationery Office, published in November, 1929.

The social and economic status has much influence on health. We can recommend *The Social Worker in Family, Medical and Psychiatric Social Work,* by Louise C. Odencrantz, Harper.

The study of children from every standpoint has received an impetus through the studies made by the various committees of the White House Conference. Most of this material is not yet in book form and cannot be offered for some time to come. Two books have been recommended by the reviewers: *Creative Activities in Physical Education,* by Olive K. Horrigan, A. S. Barnes; and *Baby's First Two Years,* by Richard M. Smith, Houghton Mifflin.

Epidemiology is represented by the following: *Epidemic Encephalitis—Report of Survey by Matheson Commission,* Columbia University Press; *Undulant Fever and Contagious Abortion,* by L. C. Bulmer, Technical Service Bureau; *Diseases Transmitted from Animals to Man,* by Thomas G. Hull, Charles C. Thomas; and *The Epidemiology and Control of Malaria in Palestine,* by I. J. Kligler, Chicago University Press. The work on encephalitis does not arrive at any conclusions because the disease offers many problems which are as yet unsolved, but we know of nothing which contains anything like the amount of information on the subject that this report gives.

Two unusually good books on tuberculosis, especially the relation of the disease in animals to human beings, deserve attention: *Tuberculosis in Man and Lower Animals,* by H. H. Scott, His Majesty's Stationery Office; and *The Prevention of Human Tuberculosis of Bovine Origin,* by William G. Savage, Macmillan.

There have been a number of short books on various aspects of food and feeding from which we have selected: *Feeding the Family,* 3d edition, by Mary Schwartz Rose, Macmillan; *Deficiency Diseases, Including Osteomalacia and Tetany,* by Alfred F. Hess, Lea & Febiger; *The Most Nearly Perfect Food: The Story of Milk,* by Crumbine and Tobey, Williams and Wilkins; and *Grow Thin on Good Food,* by Luella E. Axtell, Funk & Wagnalls.

Parasitology is well represented by: *A Manual of External Parasites,* by H. E. Ewing, Charles C. Thomas; *Hookworm Disease, Its Distribution, Biology, Epidemiology, Pathology, Diagnosis and Control,* by Asa C. Chandler, Macmillan; *Insects, Ticks, Mites and Venomous Animals of Medical and Veterinary Importance,* by Patton and Evans, H. R. Grubb, Ltd.; *Introduction to Human Parasitology,* 4th edition, by Asa C. Chandler, Wiley (replacing *Animal Parasites and Human Diseases*); and *Handbook of the Mosquitoes of North America,* by Robert Matheson, Charles C. Thomas.

Tropical Medicine is represented by: *Tropical Medicine,* by Rogers and Megaw, Blakiston, based on the extensive experience of the two well known

men in the tropics and original in arrangement and treatment; and *Tropical Medicine in the United States,* by Alfred C. Reed, Lippincott.

Several excellent biographies and autobiographies have appeared of which the following are of especial value: *Medical Leaders from Hippocrates to Osler,* by Lambert and Goodwin, Bobbs-Merrill; *Harvey W. Wiley,* Bobbs-Merrill; *Edward Jenner and the Discovery of Smallpox Vaccination,* by Louis H. Roddis, published by the author; and *Health Heroes. Edward Livingston Trudeau,* by Hallock & Turner, Heath. The most notable biography in many ways is *The Book of My Life,* by Jerome Cardan, translated from the Latin by Jean Stoner, E. P. Dutton. Cardan was a remarkable character from many standpoints, the leading physician of his time as well as a great mathematician. His character was full of apparent contradictions, and his story has now for the first time been made available to the average reader. *Plarr's Lives of the Fellows of the Royal College of Surgeons of England,* by Sir D'Arcy Power, John Wright & Sons, gives the histories of many famous discoverers of medical facts.

Many books must be classed under "Miscellaneous," some of these written for the public in nontechnical language, but containing material which the average health worker and physician will appreciate. Some of the outstanding are: *Health—What Everyone Ought to Know,* by Oliver T. Osborne, Thomas; *Disease and the Man,* by George Draper, Macmillan; *The Art of Rapid Reading,* by W. B. Pitkin, McGraw-Hill; *The Story of San Michele,* by Axel Munthe, Dutton; *The Biological Basis of Human Nature,* by Jennings, W. E. Norton; *Getting Well and Staying Well—A Book for Tuberculous Patients, Public Health Nurses and Doctors,* by John Potts, Mosby; *Science in the Service of Health,* by Elliot R. Downing, Longmans, Green and Co.; *Pioneers of Public Health—The Story of Some Benefactors of the Human Race,* by M. E. M. Walker, Oliver & Boyd; *Practical Medical Dictionary,* 11th edition, by Thomas Lathrop Stedman, Wood; *The Development of Physiological Chemistry in the United States,* by Russell H. Chittenden, The Chemical Catalogue Company; *Dietetics in Warm Climates,* by J. Neil Leitch, Robinson & Sons; *Allergic Diseases,* by Ray M. Balyeat, Davis; *Seventy Birth Control Clinics,* by Caroline Hadley Robinson, Williams & Wilkins; *Civilization and The Cripple,* by Frederick Watson, John Bale, Sons & Danielson; *History of Haitian Medicine,* by Robert P. Parsons, Hoeber; *Human Biology and Racial Welfare,* by E. V. Cowdry, Hoeber; *Medicine, Its Contribution to Civilization,* by E. B. Vedder, Williams & Wilkins; and *Recent Advances in Preventive Medicine,* by J. G. C. Haslam, Blakiston. *The Money Value of a Man,* by Louis I. Dublin, Ronald Press, shows the useless loss of wealth by premature deaths. Without wishing to appear partial we cannot but call especial attention to *The Story of San Michele,* which is largely an autobiography, as one of the most remarkable books which has been published during the year. Its popularity and human interest is attested by the fact that 30 reprints were printed in 12 months.

On the legal side, we note *A Survey of the Law Concerning Dead Human Bodies,* by G. H. Weinman, National Academy of Science, which is of interest to many classes of readers; and *The Doctor in Court,* by Edward Huntington Williams, Williams & Wilkins.

At a time when athletics is being so widely discussed, the *Symposium on Physical Education and Health,* edited by Jay B. Nash, New York University Press, will be found most useful. An-

other good book is *Handbook of Physical Education*, by E. G. Schroeder, Doubleday, Doran.

Lastly, *Blood Grouping in Relation to Clinical and Legal Medicine*, by L. H. Snyder, Williams & Wilkins, calls for attention. Written largely from the biological standpoint, it contains facts of general and practical interest.

Medical Biometry and Statistics—*By Raymond Pearl. (2d ed rev.) Philadelphia: Saunders,* 1930. 459 pp. Price, $5.50.

The word " statistics " seems destined for a place in the lists of words of greatest usage which lexicographers compile in their idle moments. The world has long known the power of the printed word; now it may come to recognize the even greater effect of a statistical formula.

When, in 1923, Raymond Pearl published his *Introduction to Medical Biometry and Statistics* he made available to public health workers all the well tested procedures which a medical statistician is ever likely to employ. Now we have the second, completely revised and enlarged edition of this valuable work. Pearl has wisely omitted certain topics of purely theoretical interest, such as his Classification of the Causes of Death for Research Purposes. He has added much useful material dealing with the preparation of record forms and their tabulation, a new chapter on the logistic curve, and, as part of Chapter I, a new section on the Nature of Statistical Knowledge. This section will repay the most attentive reading even by a trained statistician.

There is great temptation to quote from it freely, but space will permit of but one sentence: " Very likely some will not agree with its reasoning or its tentative conclusions, but even in such event, it may help the disagreeing reader to the more complete ordering of his own ideas about statistical concepts."

This observation illustrates what the reviewer considers as Pearl's greatest contribution to the field of biometry. His work has frequently called forth the expression (at times, violent) of opposing views. The important point is that were it not for his prolific researches it probably would not have occurred to many of his opponents to investigate the disputed subjects at all.

The book is thorough and exact in statements of fact, stimulating and open-minded in interpretation. The changes in the new edition have made an excellent book even more meritorious.

J. V. DEPORTE

The State Departments of Massachusetts, Michigan, and Ohio—*By James Wallace, M.D. (Sponsored by the Committee on Administrative Practice, American Public Health Association.) New York: Commonwealth Fund Division of Publications,* 1930. 192 pp. Price, $1.50.

Dr. Wallace has made a detailed study of the state health organization of 3 states having an approximately equal population. These states were well selected, in that each represents a somewhat different type of population, having varying governmental procedures and traditions. Each state has an active health service, with wide divergence of viewpoint in relation to general policies.

The book begins with a short chapter on the origin and present form of the 3 state health departments. Local health organization in each state is considered briefly, and there is a short chapter on appropriations and expenditures. The author has not considered each state separately, but has divided the book in accordance with the functions of a state health organization and has summarized the activities of all in relation to each separate function.

For example, tuberculosis control (p. 81) is treated in a short chapter. The activities of each of the states in relation to tuberculosis control are outlined. The author makes no comparisons, but the material is suitably compiled, so that the reader can make his own.

In the final chapter, the author gives a brief critical statement in regard to the organization, activities, and policies of the states under consideration.

The appendix gives the *Appraisal Forms* for rural and municipal health service as adopted by the American Public Health Association. These forms are inserted " for those who may wish to measure the achievement of the three state health departments." Since these *Appraisal Forms* relate to local health organization they have little utility as a means for measurement of achievement of state health work.

Students of state public health administration will secure much information from a careful study of Dr. Wallace's book. WILSON G. SMILLIE

Study Guide Test-Book in Hygiene —*By Dean Franklin Smiley, Adrian Gordon Gould, and Elizabeth Melby. New York: Macmillan,* 1930. 70 pp. Price, $.80.

This test-book is designed as an aid in the preparation of lesson assignments based on *The Principles and Practice of Hygiene,* designed largely for nurse training. There are 26 sections or sets of lesson questions arranged in such a way as to cover 30 class hours.

The test content is made up of various types, some of which are ordinary questions requiring a written answer, others problems of which the following is a sample:

The following situations have been reported:

a. A 10-year-old child is living in the same home with a 6-year-old brother who has tuberculosis of the knee.

b. A child was born of a mother with advanced pulmonary tuberculosis but was at once placed in the home of a healthy relative.

c. A 14-month-old child is with its mother who is an active uninstructed case of pulmonary tuberculosis.

d. An 8-year-old child is living in the same home with its father who 10 years before returned from a modern tuberculosis hospital as an arrested case of pulmonary tuberculosis and has had no symptoms since.

List these situations (by their corresponding letters) in the order of their importance to the exposed child:

1.....2.....3.....4.....

There are also questions of a type similar to the " True and False " but containing a sufficient number of statements regarding a given case so that they are a real test of information.

While at first glance such a scheme seems somewhat mechanical, it does cover the ground in a thorough way and has distinct advantages as a guide to the teacher of the class in hygiene. One objection would be, of course, that after it has been used a year or two, the lazy student will get the proper answers from some one who has previously taken the course. On the whole, this is a desirable addition to the technic of teaching hygiene. CHARLES H. KEENE

Seventy Birth Control Clinics. *A Comprehensive Survey and Analysis which Includes the General Effects of Control on Size and Quality of Population. The Nature, Extent and Status of a World-wide Movement Objectively Presented. First of a Series of Monographs on the Medical Aspects of Human Fertility Published under the Auspices of The National Committee on Maternal Health—By Caroline Hadley Robinson. Baltimore: Williams & Wilkins,* 1930. 351 pp. Price, $4.00.

The title and subtitle of this book describe it as well as any review can. It is a piece of work which has been conscientiously done, with the advice of

notable men and women, and can be regarded as an authoritative exposition of the subject as it now stands.

Chapter X which treats of the benefits which may be expected will probably strike the average reader as being too optimistic. If these could be reasonably assured, those who believe in birth control would have enormous accession to their ranks.

The book is well printed, well documented and has a good index. There are several useful appendixes.

M. P. RAVENEL

Grow Thin on Good Food—*By Lucella E. Axtell, M.D. New York: Funk & Wagnalls,* 1930. 336 pp. Price, $2.00.

The problem of reducing is largely one of will power and practical knowledge of the nutritive values of food and the essential needs of the body. The author makes her reader face the situation at the outset: "You cannot run away from a weakness; you must sometime fight it out or perish." But she also holds up visions of the gains to the victor—improved health, better looks, and freedom from the "humiliation, detestation and shame of being fat." Excellent advice is given in a very simple, entertaining fashion, always with the plea for intelligent mastery. "Anyone, no matter how stupid, can follow an 'Eat this' system but to look into the subject intelligently requires brains, brains and character."

About two-thirds of the book is devoted to proper food and one-third to proper exercise. There is very practical advice about the selection of food, for instance choosing meat as free from fat as possible, making veal the staple meat because of its leanness, cooking it occasionally in the water from boiled ham for "near ham."

There are recipes which use in attractive ways such non-fattening aids as washed bran, India gum, agar-agar, mineral oil, and saccharine. A program of pleasing and original meals for a month, including measures and recipes, provides for a woman 5 feet 4 to 4½ inches tall, with modifications for others of greater height. Programs with plainer foods, programs for men, and for those who must eat what is served, indicate the careful efforts of the author to meet varying needs.

Instruction regarding exercise is also sane and practical, emphasizing the importance of regularity and the value of play rather than drudgery.

There are some inaccuracies, such as the statement that adults need little vitamin A, and that whole wheat, peas and beans may be regarded as sources of this very important factor. Some provision of cod liver oil or one of its concentrates to insure a high vitamin A intake would seem desirable. It is regrettable that lean meat should be recommended as a source of vitamins, when it is of almost negligible value save for vitamin G, while liver, with its high vitamin content, is given no emphasis. The substitution of the common yeast extracts rich in vitamin B for bouillon cubes with practically no nutritive value would be in line with the author's aim to keep the supply of vitamins high.

On the whole the book is a most welcome popular interpretation of the way in which reducing may be accomplished on truly good food, attractive in form and flavor as well as a means to health, beauty, and happiness.

MARY S. ROSE

Safety Town Stories—*By Mildred Miles Roberts. Chicago: Lyons & Carnahan.* Price, $.60.

In this story book for boys and girls, ages not stated, Sally Safe is a girl who always does the careful thing, looks before she leaps, washes her hands before she eats, gives penny lectures to her

sister Susie Sorry, who, as you may have guessed, always does the wrong thing and reaps the inevitable consequences of her carelessness. To the adult mind, the stories are simply appalling, but undoubtedly to the child they are as natural and as absorbing as the so-called funnies are delightful.

Who can tell whether reading these stories will cause children to be more cautious, to abstain from dangerous pastimes? Is caution an entirely desirable trait? Probably only good results from the reading, but it is possible that the more sportingly inclined youngster might try to do Susie Sorry one better just to see what would happen.

Health workers with a flair for child behavior might put the book to the test. It is attractively printed and illustrated, and ought to be most acceptable to children. RAYMOND S. PATTERSON

Strategy in Handling People—*By Ewing R. Webb and John J. B. Morgan. Chicago: Boulton, Pierce,* 1930. 260 pp. Price, $3.00.

The question may well be asked why this book should be noticed in these columns. It is not a public health book, and moreover it can hardly be designated as scientific; yet it contains a vast amount of practical information directly applicable to the daily task of the health executive.

Many a health officer has discovered to his surprise that his success in inaugurating and developing an effective health program depends less on his technical knowledge and scientific training, which he has perhaps systematically labored for years to acquire, than on ability to get appropriating bodies and influential individuals to give him the necessary practical support. This ability which is generally assumed to be an intuitive trait of personality or acquired without special study is here revealed to be susceptible of development by the process of learning.

It is a textbook on successful human relationships. There is little that is new in it and the scientific principles of psychology have been indicated in only the slightest degree to substantiate its empirical presentation. The authors have, however, rendered a valuable service in classifying some 20 or more types of ordinary business, diplomatic and political relationships and illustrating by concrete examples how they have been successfully handled by eminent persons. The conversational style in which the incidents are elaborated makes the book easily readable.

It is remarkable to note in a book on this subject that among the hundreds of illustrious personages used as examples, the only woman is Evangeline Booth. Over three hundred references are given, most of which are to biographies.

A careful study of this book by public health workers and the skillful application of its principles with the right people should increase public health facilities far beyond those which have been attained by preachment, persuasion, publicity and politics. No indication is given as to what will happen when everybody has learned the lessons given and we all " strategically " handle each other. HOMER N. CALVER

A Manual of the Common Contagious Diseases—*By Philip Moen Stimson, M.D. Philadelphia: Lea & Febiger,* 1931. 351 pp. Price, $3.75.

This manual is the outgrowth of notes on lectures given at the Cornell University Medical College. It is intended primarily as a clinical guide for medical students and internes, though the author expresses the hope that it will be found useful for nurses and practitioners of medicine, especially those engaged in school work.

It is well written, up-to-date, and gives all of the facts concerning etiology, symptoms, treatment, prevention, and the protection of contacts, which is re-

quired. There is a glossary which should not be needed for those capable of understanding the text, and a useful table giving a summary of the most common contagious diseases.

The chapter on General Management of Contagious Diseases, which includes the technic and rules practised at the Willard Parker Hospital, with which the author is connected, is most useful. The illustrations are excellent.

It strikes us as being one of the best of its type which has come to our attention. It can be unhesitatingly recommended. The printing and make-up are excellent. M. P. RAVENEL

Tests and Measurements in Physical Education—*By John F. Bovard and Frederick W. Cozens. Philadelphia: Saunders,* 1930. 364 pp. Price, $2.75.

This is an outstanding contribution to the scientific side of physical education. It discusses the need and use of physical tests; gives a historical sketch concerning the development of measurements in physical education; and discusses in considerable detail the typical contributions in the field, covering such factors as anthropometric measurements, strength tests, cardiac functional tests, ability and adjustment tests for elementary and secondary schools, and for colleges for both men and women. It includes also tests on neuromuscular control, and those using sport technic as a measuring rod.

There is an excellent section on tools of measurement covering such factors as elementary statistical methods, graphical methods, and methods of scoring tests. There is a third section on the theory and practice of test administration.

An excellent bibliography in the field of physical tests and measurements, and an appendix made up largely of tables necessary for scoring certain outstanding tests end the book.

While this book is an expansion and a rearrangement of a University of Oregon publication by the same authors issued in 1926, it is much more complete, and much better arranged.

This excellent contribution does for physical education what so many other authors have endeavored to do for other types of education.

CHARLES H. KEENE

Ethics Talks to Nurses—*By Mary E. Gladwin. Philadelphia: Saunders,* 1930. 281 pp. Price, $2.00.

The more one deals with nurses the more he is impressed with the important part good nursing ethics plays in their professional success. And since ethics means the science of duty or of conduct from the standpoint of right or wrong it is absolutely fundamental.

The author displays rare common sense and a fine insight into psychological principles. For instance, sentences like these ring true: "Nervousness is often a form of selfishness," and "A good deal is said about the necessity for *self sacrifice* on the part of nurses when what is really meant is *self control.*"

Every point made in the book is well illustrated by a concrete example which is obviously drawn from long experience in nursing practice and nursing teaching. The chapter on "The Patient and the Nurse" is especially good. Miss Gladwin shows here that many nurses show no lack of skill or technical knowledge yet they fall short of being true nurses by displaying little mannerisms and habits which might be put under the heading of bad manners. She shows that the first duty of the nurse is to study and know herself and subject herself to rigorous self discipline so that she may have the poise and delicacy of touch and feeling which contribute to the art of nursing.

Some of the chapter titles are Observation, Gossip, Truth, Discipline,

Punctiliousness, The Opposite Sex, Good Manners, Fees and Gifts, Vocabularies and Books, and Success. The last chapter, entitled Our Exemplar, constitutes a rare climax; it is really the most unique and beautiful thing about the book, for Our Exemplar is none other than Florence Nightingale herself. One has only to read of her life and character to know that she epitomized all our ideals of nursing ethics.

Miss Gladwin's little book deserves to be widely used not only in nursing schools but among graduate nurses, who will emerge not only better nurses but better women after spending an hour or two immersed in its pages.

EVA F. MACDOUGALL

Laboratory Medicine. A Guide for Students and Practitioners—*By Daniel Nicholson, M.D. Philadelphia: Lea & Febiger,* 1930. Price, $6.00.

This is justly called a guide for students and practitioners. It does not contain all the various tests found in some of the older and more voluminous texts, but gives briefly and clearly the various laboratory procedures of proven value in the diagnosis of disease. It shows a real effort to explain the rationale of and indications for the various diagnostic procedures described, this being one of the most valuable features of the book, especially to the student.

There are included some of the newest diagnostic tests which heretofore have been found in various journals, as the biological test for pregnancy of Ascheim and Zondek, newer methods for investigation of the gastric secretion by the hypodermic injection of histamine, and the use of blood grouping in cases of disputed parentage. Other important sections are found on classification of anemias; recent views on hematology; classification of nephritis with the typical urinary findings in each type; use of convalescent serum in treatment of measles and poliomyelitis; cutaneous reactions to proteins; and rapid microscopic tissue examination of Terry.

Some omissions are noted, as the recent work of Sabin on the rapid method of typing pneumococci, the value and utility of which is well established, the examination of skin lesions for blastomyces and sporothrices, the Kahn tests for brucellosis and tularemia. The test for non-protein nitrogen is not given, since the blood urea nitrogen has the same significance. The wisdom of including therapeutic hints in a volume of this sort is probably open to question in principle.

We hope that these minor defects will be remedied in a second edition. In the meantime it can be said that this is one of the best of books on its subject. The printing, illustrations and make-up are excellent.

LOUIS F. HOWE

Annals of the Pickett-Thomson Research Laboratory. The Pathogenic Streptococci. Vol. 6. The Role of the Streptococci in Scarlet Fever—*By David Thomson and Robert Thomson. Baltimore: Williams & Wilkins,* 1930. 470 pp., 13 pl. Price, $10.00.

A careful survey of the vast literature on scarlet fever is presented in this volume of the series on the streptococci. Fortunately the authors have devoted the entire volume to scarlet fever, reviewing published work in some 1,400 papers. Due to the discovery of the Dick toxin and the Dick test, researches during the past 5 years have been greatly stimulated and this entire field is here carefully presented. (For a full account of the various researches on the etiology of scarlet fever up to the year 1924 the reader is referred to Volume I, pages 115 to 172 of this same series.)

The bacteriology, immune reactions, diagnosis, infectivity, modes of trans-

ference, and complications of scarlet fever, as well as such problems as are presented, for example, by carriers, are presented in a manner which is clear and unbiased and will permit the reader to form his own conclusions. An example of the variety is found in studies on the spread of scarlet fever by books. It has been found that, under experimental conditions, *Streptococcus scarlatinae* will survive on inoculated books and can be recovered from them during a period of 4 weeks.

Probably the most immediately helpful part of the monograph, apart from the preface, is the authors' summary and conclusions. Fifteen points are presented which appear as different lines of proof that scarlet fever is caused by a specific hemolytic streptococcus, called the *Streptococcus scarlatinae.* By means of sugar tests, litmus milk test, and the iodine test *S. scarlatinae, S. erysipelatis, S. puerperalis,* and *S. pyogenes* can be differentiated.

This monograph is a tribute to careful editing and printing. Excellent plates of photographs and a careful index add to this distinctly valuable contribution to our literature on the streptococci. ESTHER W. STEARN

The Guidance of Mental Growth in Infant and Child—*By Arnold Gesell. New York: Macmillan,* 1930. 317 pp. Price, $2.25.

Dr. Gesell, in this new volume, has brought together, in a number of brief chapters, many phases in the growth and development of the child. The historical backgrounds are delightfully sketched so that one may follow step by step the ideas and methods adopted in our guidance of the child. The most unique chapter is entirely pictorial, being made up of reproductions of fascinating engravings by Currier and Ives, illustrating child life in the early 19th century. It gives one a sense of the great distance we have travelled in child welfare since the Victorian era. The latter part of this same chapter sets forth a series of photographs relating to child development and child guidance, taken in the observatory playground of the Yale Psycho-Clinic. Here one may study the child as he really is, untrammeled by adult modes.

The chapters on the history of the kindergarten in relation to its new rôle, and the growth of the nursery school movement point out the differences in the English and American organizations, and give an excellent evaluation of their functions. Part II presents problems and methods of child guidance, illustrated by the results of Dr. Gesell's measurements of observations of the mental growth of the child, which bear out his thesis that differences in mental reactions may be studied and measured early in the first year and that these differences project themselves into the later years. The chapter on accidental deaths of young children is timely and practical.

Part III gives an excellent brief sketch of the science and protection of child growth in which the relation of heredity to mental growth is concretely set forth.

Perhaps the most signal value of this book is the orientation it gives to the whole subject and the stimulus to further research. It is thought provoking. Dr. Gesell, always the investigator and inspiring teacher, reveals his many-sided interests here. R. A. BOLT

A System of Bacteriology in Relation to Medicine. Vol. VII. Virus Diseases, and Bacteriophage—*The Medical Research Council. London: His Majesty's Stationery Office (Distributed in the United States by The British Library of Information, French Bldg., 551 Fifth Ave., New York),* 1930. 509 pp. Price, $6.00.

The Introductory Survey (Chapter I), written by W. E. Gye and J. C. G.

Ledingham, presents problems as to the nature of viruses. Their study shows them to possess few peculiarities other than dimensional, which mark them off unequivocally from visible microbes, though the inclusion bodies in cells noticed in a number of virus diseases should be emphasized, because so far it has not been possible to produce similar structures by means other than the particular virus.

Recent investigations by Hadley, and other American workers, on the filtrable stages of well known organisms suggest that the final word as to the distinguishing differences between viruses and bacteria has not been written.

The difficulties encountered in culturing viruses in the absence of living tissue closely parallel those met in the slow and gradual growth of the filtrates of certain ontogenetic forms of bacteria, though for the latter the presence of living tissue is not a requirement. The authors of this chapter feel that the onus of proof rests on those who suggest that viruses are not living entities but ferments or enzymes. The known facts supporting the various ideas as to the nature of viruses are briefly discussed.

Chapter II, on cell inclusions, is concluded with instructive suggestions as to methods whereby our present unsatisfactory knowledge may possibly be improved by "illuminating facts."

The greater portion of the book is devoted to a consideration of specific virus diseases of plants and animals, particularly the latter. Chapters are written by various authors and there is considerable diversity in the method of presentation. Thirty-six pages are devoted to bacteriophage and cognate phenomena.

To each chapter references are appended. It is to be regretted that an index is missing, for a table of contents may serve a student while at school, but an index is requisite for the ready reference demands of those in advanced and research work.

Volume VII of the *System of Bacteriology*, written under the auspices of the Medical Research Council of England, may be rightfully considered as particularly stimulating to research. Few problems in medicine are more provocative of thought and subsequent research than are those relating to the virus diseases and the bacteriophage. There has never been so urgent a call for complete coöperation of the many branches of biological and physical sciences in bacteriological research as in the present epoch making but chaotic time. These volumes are welcomed for their clear presentation of at least a large part of the knowledge of medical bacteriology, much of which is in the experimental stage.

ESTHER W. STEARN

The History of Physical Education in Colleges for Women—*By Dorothy S. Ainsworth. New York: Barnes*, 1930. 116 pp. Price, $2.00.

This is a very much worthwhile effort to trace the development of physical education in 12 of the oldest colleges for women, with a brief introductory chapter sketching the development of physical education in the United States.

The chapters cover such problems as the development of the theory of physical education for women; the growth of the programs; the gradual installation of equipment; the number and types of activities of the staffs; the departmental organization used; the organization and activities of athletic associations; and the gradual modification of costume up to the present one permitting freedom of movement.

Summarized, the author concludes that the most outstanding responsibilities of the physical education department are: (1) to ascertain the physical condition of each student; (2) to pre-

sent a program which will meet the need of each student, taking into consideration her differences of individuality, skill, and vitality; (3) to give the student sufficient skill and interest in some activity to make probable the continuance of this activity both in and after college; (4) to offer the student situations in which she may express and develop her own ideas; (5) to have a program which in the eyes of the majority of the students is reasonable and interesting; and (6) to stress consistently definite standards of conduct.

Thoroughly trained teachers with high ideals are essential to the success of such a program.

CHARLES H. KEENE

Ergebnisse der gesamten Tuberkuloseforschung—*Herausgegeben von H. Assmann, Leipzig; H. Beitzke, Graz; H. Braeuning, Hohenkrug-Stettin; St. Engel, Dortmund. Vol. 2* (*Leipzig, Georg Thieme*), 1931. 490 pp., 106 figs. Price, M. 45 bound.

The second volume of this monograph by specialists on the various phases of tuberculosis has 10 sections dealing mainly with the disease, its acquisition, pathology, detection, and treatment. The opening chapter by Dr. Blumenberg of Berlin is, however, devoted to the much contested question as to whether or not there is an invisible or filterable form of the tubercle bacillus. He concludes that overwhelming proof of the existence of an ultra-visible TB-form is still lacking, though evidence for its polymorphism is incontestable.

The pathological anatomy of apical tuberculosis of the lungs is described and figured by Drs. Loeschke and Dehoff. An interesting review and discussion of extra-domiciliary infection is given by Dr. Ickert, who notes that the earlier categories of classification of the sources of infection are, in the light of current knowledge, no longer adequate, and, moreover, that statistical data as usually obtained have less critical value than single fully investigated cases. Factors such as the hereditary disposition or constitution, and the extent, rate, and sequence of infections, enter into and complicate the problem of separating the domiciliary from the extra-domiciliary origin of tuberculosis.

Studies made by Ickert in East Prussia on 994 infected children show the highest percentage of infections (19.7 per cent) to have had their origin from tuberculous teachers. Next in order (17.3 per cent) were infected school children, (15.1 per cent) members of the family, (9.5 per cent) children of families in which active tuberculosis was present, (8.8 per cent) unknown, (8.1 per cent) other members of the household, (4.9 per cent) business and professional contacts, (4.2 per cent) visiting relatives, (4.2 per cent) visiting children from tuberculous families, and (only 0.4 per cent) from tuberculous cows.

Other chapters deal with sanatoriums for the tuberculous, selection of patients for treatment, clinical concepts of tuberculosis in the light of the French investigations, mineral metabolism and water turnover in tuberculosis, artificial bilateral pneumothorax, prognosis in tuberculosis in children, and the anatomy, radiology, and clinical significance of interlobar clefts.

The book has full bibliographies and an author and subject index.

C. A. KOFOID

Problems in Contemporary County Government—*By Wylie Kilpatrick, Institute for Research in the Social Sciences, University, Virginia,* 1930. 666 pp.

A comprehensive survey of the process of county administration in the State of Virginia is presented in this volume.

Each of 7 main divisions is devoted to an essential aspect of county government, including functions, finance, area, personnel, physical plant, relationship, and management.

Under the coöperative health units are outlined: (1) the definition of the county health board and accompanying organization, (2) the division of responsibility between the state and county, (3) the staff attached to the county health agency. The county health agencies include in their functions such vital factors as the registration of vital statistics, tuberculosis control, sanitary engineering, social hygiene, hospitals and laboratories, child welfare, and education.

The public welfare organization has as its manifold functions the relief of the poor in institutions and homes, the study of child welfare and mental hygiene, hospitalization of defectives, and the care of the delinquents.

Under county and rural planning are considered the systematization of highways and roads, regulation of traffic, erection of billboards, regulation of use of land, park system, recreational facilities, conservation of natural resources, and the promotion of forestation.

Part II treats of the problem of finance or the operation of the county financial process. The economic appraisal includes values, topography, soil composition and quality of lands, use and productivity, fertility, water supply and natural resources, and accessibility to transportation and markets. Statutory provisions and administrative agencies are considered. The various processes requiring coördination consist of taxing power and raising of revenue, use of credit, selective process of officials, enactment of legislation, and issuance of administrative rules. The term "town-county-government," representing the local governing process of Virginia towns, comprises all municipalities in the state below 5,000 in population. Except for a few special districts, as the sanitary district, the town is the one unit of local government with which the county uniformly maintains close relations throughout the state.

A commendable feature of the survey is its frankness; it discusses failures as well as successes. The material, with rich statistical evidence, is well presented; the type is clear and readable; and the subdivisions are logically captioned.

IRA V. HISCOCK

Through Early Childhood—The Care and Education of the Child from Three to Nine—*By Arthur Whitefield Spalding and Belle Wood-Comstock. Mountain View, Calif.: Pacific Press Publishing Assn.*, 1930. 344 pp. Price, $2.00.

This book is Volume Three of the five volume set of *The Christian Home Series*. The others are: Vol. I—Makers of the Home (General; for youth, the newly married, and parents); Vol. II—All About the Baby (Infancy—first 2 years); Vol. IV—Growing Boys and Girls (Pre-adolescence—10 to 13); Vol. V—The Days of Youth (Adolescence—14 to 20).

The authors' plan calls for study during each of the months of the year, the book being divided into 12 sections of 4 chapters each. In general, the first chapter in each section deals with government and environment, the second with nature study, the third with health, the fourth with social and religious training.

At the end is an appendix containing questions relating to the text, and problems for study and discussion; an index; and a bibliography.

This book is designed primarily for parents. It might well have borne, as a title, "Through Early Parenthood." It would have value too for elementary

school teachers and for young adults. It has throughout a strong religious and ethical content. In general it covers such factors as mental hygiene, sex education, nature study, cleanliness, nutrition, and the treatment in the home of simple ailments.

This is a valuable text, particularly for young parents. The information is given in a very interesting way, and is definite and simple enough in content and procedure to be really usable. An unusual production of a type quite different from the ordinary text on health teaching and child training.

CHARLES H. KEENE

Allergic Diseases. Their Diagnosis and Treatment—*By Ray M. Balyeat, M.D., F.A.C.P. Philadelphia: Davis,* 1930. Price, $5.00.

The present volume was first issued in 1926 under the name "Hay-Fever and Asthma." In this edition the name has been changed and considerable new material has been added, particularly in methods of determining the cause of allergic conditions other than hay-fever and asthma, such as eczema, migraine, urticaria, and certain forms of mucous colitis.

The book is pleasantly written and is useful for the sufferer as well as the physician. It is abundantly and well illustrated. The fact that it has gone through three editions in approximately 4 years shows that it has a place and has given satisfaction. This last edition will be found even more useful than its predecessors. M. P. RAVENEL

L'Hygiène Publique en France—*By A. Landry. Paris: Librairie Félix Alcan,* 1930. 173 pp.

The book contains a chapter on maternity and infancy welfare work in France. As one of the most important measures for the welfare of mothers, the author points out the law of 1913, amended several times since, which provides for all women of small means a cash benefit paid from public funds for 4 weeks before and 4 weeks after confinement. A nursing benefit is also paid for 12 months, if the woman nurses her child. The number of women receiving these benefits has been greatly increased since the enactment of the social insurance law early in 1930.

Infant health centers are maintained by the municipalities as well as by private organizations.

The custom of placing out children with wet nurses is very prevalent in France, and a law has been in existence since 1874 which provides medical supervision over all such children. However, the administration of this law has been often criticised; it has been charged that the midwives and the parents often fail to make the necessary report to the authorities and thus escape supervision, and the examining physicians fail to carry out their duties properly.

Other chapters describe the organization of public health work in France and the teaching of hygiene in public schools. IRA V. HISCOCK

The Development of Physiological Chemistry in the United States—*By Russell H. Chittenden. American Chemical Society Monograph No. 54. New York: Chemical Catalog Co.,* 1930. 427 pp. Price, $6.00.

The author is in a singularly advantageous position to undertake this presentation. One might almost say that he officiated at the birth of physiological chemistry in the United States, and has been a directing force throughout its development. In his treatment two interrelated themes are carried along together through the work; one a history of the development of organized activity and personnel, the establishment and growth of laboratories, and the training of men competent to undertake productive scholarship in this field; the other

a history of the problems attacked and the results obtained by the various groups of workers. The latter phase is the more important contribution of the work. The development of the two themes is not entirely parallel, but they interlace and each augments interest in the other, though it is true that such treatment demands certain sacrifices both as to order of presentation and perspective.

While the development of the first theme becomes in the latter part of the book merely a sort of incomplete Who's Who among workers in the field of physiological chemistry, and will probably be of limited interest, the book as a whole should find a large circle of friends in all the various fields of both biology and of chemistry. One cannot help feeling that it has been written by one who possesses not only a broad view of the field and vision of its possibilities, but also a comprehensive and firm grasp of the work done in this country.

The stimulating character of the volume is brought out by the fact that while its function is not primarily to suggest problems, many will find that interesting unsolved problems seem naturally to come to mind while one is reading—not merely one here and there, but many. It is a picture done in bold strokes but the outlines of which are firm.

There is a good "Author Index," but one must depend on the "Contents" for subject matter. The printing and make-up are excellent. ALLEN E. STEARN

Handwörterbuch der psychischen Hygiene und der psychiatrischen Fürsorge—*By O. Bumke, München, G. Kolb, Erlangen, H. Roemer, Illenau, E. Kahn, New Haven.* (*Berlin and Leipzig: Walter de Gruyter & Co.*) vi + 400 pp. 1931. Price, bound, M. 25.

The widening interest in the field of mental hygiene and the diversity and social divergences of the professional groups and social and governmental agencies concerned with this remedial process distinctly call for a comprehensive work dealing with this subject. It is to be found in this monographic dictionary in which are assembled the facts and theories of psychiatry and of psychology as applied to the mentally aberrant.

The rubrics are relatively few, in fact only 72 in all. They range from alcohol to world philosophy, and include such topics as industrial hygiene, psychical hygiene, marriage, eugenics, nutrition, epilepsy, encephalitis, institutional equipment and care, and organization of institutions of various types and purposes, juvenile psychopathy, social life, sexual life, delinquency, constitution, Kultur, the occult, spiritismus, opium laws, suicide, and suggestion. C. A. KOFOID

Growth and Development of the Young Child—*By Winifred Rand, R.N., Mary E. Sweeny, M.S., and E. Lee Vincent, Ph.D. Philadelphia: Saunders,* 1930. 394 pp. Price, $2.75.

Our modern knowledge of early childhood has been considerably enriched in recent years. This has been due largely to coöperative research carried on in connection with nursery schools or child welfare institutes. A pioneer in this field is the Merrill-Palmer School of Detroit. Out of the fertile experience of this school has emerged recently one of the most comprehensive and well balanced books on growth and development of the young child it has been our pleasure to read.

This book is unique in beginning with an exposition of the philosophy of family life which is fundamental to an understanding of the child in its modern relationships. "The Family and the Home as Backgrounds for the Growth of the Child" gives us, in the second

chapter, a basis for both the hereditary and environmental considerations which follow. There is presented a well proportioned picture of the child in its family relationships with critical evaluation of the conflicting elements in modern home life.

Throughout the book the physical growth and development of the child are so interwoven with its emotional and personality development that we feel from beginning to end it is the whole child in its multiform relationships with whom we are most deeply concerned. The book bespeaks that intimacy and understanding of child life which only those who have been in sympathetic daily touch with the child could really picture.

The subject matter is arranged in such a way as to give a sense of proportion to the whole. Helpful references are found at the end of each chapter and a selected bibliography of 165 titles adds to the value of the volume.

R. A. BOLT

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HEALTH DEPARTMENT AND OTHER REPORTS

IRA V. HISCOCK

The **Bellevue-Yorkville Health Demonstration, New York, N. Y.**—The report of the Bellevue-Yorkville Health Demonstration for 1929 states that gross expenditures amounted to $155,911.87, of which $148,043.51 was contributed by the Milbank Memorial Fund. In accordance with plans initiated at the start of the demonstration for the peak of expenditures to be reached in 1929, a budget of $150,000 was prepared for 1930, as compared with $172,500 for 1929, adopted by the Board of Managers and approved by the Board of Directors of the Milbank Memorial Fund. This budget provides for assistance to the Health Department in the way of salaries for additional medical, nursing and clerical staff, and for special consultants in nutrition, mental hygiene, recreation, and social service to act as advisers to the nurses and in clinics.

At the beginning of the year the medical services carried on in the Bellevue-Yorkville Health Center consisted of a baby health station, a preschool clinic, an evening clinic for venereal diseases, the Yorkville chest clinic and a tuberculosis diagnostic service. In addition, three other baby health stations were maintained, at which there were 873 new registrations during the year. The number of children receiving three injections of toxin-antitoxin at the baby stations was 2,719. The children's clinic which had been conducted by the Association for Improving the Condition of the Poor was taken over on November 27 by the Health Department as an extension of its pediatrics service at the Health Center.

In January, 1929, a consultation service was opened for private physicians of the city, to aid them in making a diagnosis of patients suspected of having tuberculosis. Only patients sent by their physicians are examined at these three weekly sessions. No advice or information is given the patient, but a full report is made to the physician.

The number of nurses in the combined Bellevue and Yorkville Districts, who also serve territory out of the Bellevue-Yorkville area, averages 37. In the Yorkville District, the generalized system of nursing was introduced in 1929; in the Bellevue District, nursing organization is based on the specialized plan, each nurse being assigned to work either in school hygiene or in preventable disease work.

The statistician of the New York Tuberculosis and Health Association acts as consultant to the demonstration. Monthly reports are prepared on the volume of public health work in the area. The special undertakings of the statistical staff during 1929 include tabulation of the physical defects among school children examined, a brief analysis of new registrations during 1928, a study of the nurses' reports by principal lines of services to show time distribution, the case load, and a study of the number of household contacts to the tuberculosis cases under the care of the Yorkville clinic.

General health education and publicity in the demonstration area for 1929 included the distribution of over half a million pieces of printed matter, including 12,000 posters, to residents, doctors, dentists, schools, stores, clubs, health agencies, the publication of six issues of *Health News*, a picture newspaper, and the coöperation in the city-wide campaign for immunization against diphtheria. Three times as many children received the three toxin-antitoxin inoculations in 1929 as in 1928 at the baby health stations. The campaign in the

interest of periodic health examinations was also continued, in coöperation with the County Medical Society and the independent medical societies located in the district. As a result of 30,000 cards being distributed to school children, urging a yearly health examination, the health center was deluged with children asking for examinations. An emergency service was established to take care of those who had no physician, and who came accompanied by their parents, and 1,171 children were examined at a cost of $.35 per child.

Health education in the schools has been developed by the organization of close relationships among principal, doctor, nurse and teachers, the immediate responsibility within the schools being that of the assistant principal. New developments have been regular conferences with the special teachers of health education, assistance with the teacher-training courses for grade teachers, development of a junior high school program, and the beginning of a more definite study of behavior problems.

The recreation problems of Bellevue-Yorkville resolve themselves around the improvement of the conditions within the district, which include but a small amount of safe outdoor play space, and the inability of a large number of children to enjoy vigorous play. A district recreation conference held at the health center in the spring of 1929 recommended possible plans for use, and secured the opening of a summer playground. Emphasis was placed on day outings in order to compensate for the inadequacy of play space within the district. Most of these were to parks, and some were for education in connection with the safety-and-health campaign in summer playgrounds. An important part of the recreation work in 1929 was the directing of recreation classes in three Catholic schools of the district.

By an arrangement between the demonstration and the Henry Street Visiting Nurse Service, a consultant in mental hygiene was added to the staff at the health center in April, 1929, the activities being twofold—those with the nursing group as a whole, and those with the individual nurse working on a special problem. At the close of the year, about 125 active mental hygiene cases were being carried by the Henry Street nurses in the district, representing a wide variety of problems which varied from many cases of poor health habits to neuroses, psychoneuroses and a few definite psychoses.

Montclair, N. J.—The 1929 health audit of the town of Montclair, N. J., is the yearly report of the work carried on by the Department of Health. Montclair had an estimated population in 1929 of 40,264. The resident death rate was 9.4 per 1,000, and the resident infant mortality rate for 1929 was 43.5, for which considerable credit is due to the prenatal and postpartum activity carried on in connection with Mountainside Hospital by the Nursing Service of the Red Cross. Tuberculosis showed a slight decrease over 1928.

Of 445 re-Schicked school children, 298, or 67 per cent, were found immune; 148 were reinoculated. Of the 678 school children Schick tested for the first time, 212, or 31 per cent, were found to have a natural immunity. In the preschool clinic, 560 children received the toxin-antitoxin inoculations. The chest clinic, opened in 1905 by the Montclair Tuberculosis Committee, and since 1912 conducted jointly by the committee and the Department of Health, has been taken over entirely by the latter. The total attendance during the year was 286, the total number of patients 109, of whom 54 were new. Seventy-six patients were taken to the sanatorium.

The department passed an ordinance in 1929 which will limit the sale and

slaughter of poultry only to those having first class sanitary establishments. To insure against the danger of undulant fever, a letter was sent to all of the producers and distributors of raw milk warning against the menace and advising agglutination testing of herds.

Pittsfield, Mass.—In the 1929 annual report, the health officer of Pittsfield records an infant mortality rate of 68.7 and a neonatal rate of 42.6 in this city of 51,000 estimated population. During the first 3 months of the year, an increase in influenza cases reached epidemic proportions, 81 cases occurring at that time. There were but 4 cases during the remainder of the year, the deaths for 1929 totalling 12. There was a slight increase in the number of cases of diphtheria and scarlet fever, but no case of smallpox was reported.

Tuberculosis cases (29) and deaths (18) reached the lowest figure that has been recorded since there has been adequate reporting. Twenty-three of the 29 cases were hospitalized. The average number of farms supplying milk to the city was 170; 199 dairies were inspected and 501 samples of milk collected. The number of cows under test in the city exceeded 85 per cent—thus Pittsfield is eligible to be classed as a modified tuberculosis-free area.

The spring round-up was held in June, and a visit was made by a health department nurse to the parents of each child expecting to enter school in the fall of 1930. Parents were advised to take their children to a physician to be examined for medical defects and to be vaccinated. The clinic at the health department was held to accommodate those families who were without a family physician or who could not afford to visit a private physician. May Day activities were confined to dental work. The dental hygienist examined 2,007 children, and 1,361 were found to have dental defects. The total number of corrections accomplished by this one examination was 2,364.

The 1929 budget contained an appropriation for mosquito control, and a member of the Harvard School of Public Health took charge of this work with favorable results. The report concludes with an appraisal of the city's health activities, following in detail the *Appraisal Form for City Health Work* of the American Public Health Association.

Hawaii Dental Survey—A comprehensive survey of the dental problem in the Territory of Hawaii was made in 1930 under the auspices of the Department of Public Instruction of the Territory and the Strong Foundation. The report of 158 pages by Guy S. Millberry, D.D.S., F.A.P.H.A., is broad in scope and of special interest to public health administrators and to those engaged in dental hygiene work.

This report describes in detail a community dental hygiene program which is probably unsurpassed in the country, and makes recommendations for future development. Many photographs, charts and statistical tables are presented, together with survey forms which should prove useful in studying dental programs elsewhere.

The 12 chapters of the report review the development of dental hygiene work and deal with important problems of legislation, organization and personnel, policy and procedure, records, finance, objectives and accomplishments, the dental profession, the press, research, and advanced instruction.

A school of dental hygiene was organized in 1921, in conjunction with the normal school, and three classes were graduated. All but one of the graduates entered school service in the territory. In 1920, the Honolulu Dental Infirmary was organized, and this work was later moved to a convenient wing at Palama Settlement where 5 dental operators were employed. In 1922, the

division of dental hygiene was organized in the Department of Public Instruction. In 1929, 98.8 per cent of the children in the public schools received instruction in dental hygiene or care. The dental hygiene division is under the direct control of a supervisor who reports to the superintendent of the public school system. In Honolulu, this work in the schools is correlated with treatments in Palama Settlement. "The influence of the program has extended beyond the schools into all territorial institutions and many private ones, a further endorsement of its value. . . . The passing of the Act of 1922, creating the Division of Dental Hygiene under the jurisdiction of the Superintendent of Public Instruction, is one of the outstanding pieces of dental health legislation in the country."

Montreal, Que.—The 1929 report of the department of health opens with a table of contents and an organization chart which shows the bureaus, personnel and activities of the department. The chart also indicates that the department of health functions under an executive committee with an advisory board of health of 9 members consisting of the chairman of the executive committee and the director of health *ex-officio*, 3 members of the city council, 2 members each of the faculties of medicine of the University of Montreal and of McGill University.

On the basis of an estimated population of 762,000, the per capita expenditure for the section of hygiene under the department of health amounted to $.57, while that for municipal assistance was $1.68. Other expenditures of the department included pensions and annuities, and allocations of $20,000 to universities. A birth rate of 26.79 and a death rate of 13.9 are recorded. The infant mortality rate was 132.3. Comparative data for 10 previous years are presented. Many interesting statistical tables are accompanied with descriptive text.

The National Committee for Mental Hygiene in Canada organized in 1929 a section for the Province of Quebec. The executive committee and the department of health inaugurated a program in the schools of the Catholic School Commission of Montreal, which is later to be operated in the Protestant schools. Two psychiatrists and two nurses with psychology training were employed to work with and instruct the physicians and nurses of the department of health engaged in school medical inspection work. During the school year the work was carried on in 17 schools attended by 12,500 pupils.

An agreement became effective between the school commissions and the department of health to establish close coöperation in school medical inspection. During 1929, 3,221 children were given three antitoxin Ramon inoculations as a protection against diphtheria. A Schick test was given these children 4 months after the last injection, and if positive, a fourth injection was given. A total of 15,337 smallpox vaccinations were given by physicians in the divisions of child hygiene and communicable diseases.

By July, 1929, 37 municipal baby clinics were in operation, an increase of 20 over the previous year. These clinics are operated by the staff of medical inspection of schools. In school sub-districts where a baby clinic exists, the school nurse is in charge with an assistant nurse (not a graduate). The other clinics are intrusted to graduate nurses, each of whom is in charge of two clinics. Medical inspectors serve one or two clinics and each of 11 part-time physicians have a clinic. There were 37,496 consultations in clinics with 33,568 home visits. Besides these municipal clinics there are 34 independent baby clinics in the city, 18 under the management of the Federation d'Hy-

giene Infantile, and 16 under the Child Welfare Association. These latter clinics submit monthly reports to the department of health.

Brookline, Mass.—During 1929, 509 births were recorded, of which 398 occurred outside of town to residents. There were 525 deaths in this community of 47,100 population, but 157 of the decedents were non-residents. There were 5 cases with no deaths from diphtheria. During the 6 years previous to 1923 when immunization work was undertaken, there were 288 cases and 11 deaths from diphtheria. During the 6 subsequent years, there were 51 cases with no deaths from this disease. An infant mortality rate of 43.3 is recorded.

A health bulletin has been published quarterly and distributed by the Police Department to every house in the town. The purpose of the bulletin is to promote education in health matters and to inform residents of the quality of milk sold by the various dealers.

A decision of the Boston Medical Milk Commission made it possible for certified milk to be sold as a pasteurized product as well as raw. Specifications for school milk were revised to provide additional safeguards, including a requirement that the producing animals be tested and certified as free from contagious abortion. The milk is processed by the spray vat system, and the jars are sterilized in an automatic thermostat-controlled machine and automatically filled and capped to avoid human contact with the milk. The average dairy score was 93.8 and the average bacteria count of this school milk was 11,272.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

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Public Medical Service in England—A straightforward and apparently unprejudiced account of the scheme for medical service for the industrial population. How the service affects public health is touched upon.

HARRIS, R. W. National Health Insurance Medical Service in Great Britain. Canad. Pub. Health J., 22, 2: 55 (Feb.), 1931.

Hunger Striking Children—Most children who present the problem of anorexia are of the linear type, fatigued and irritable. Diets high in fat are contraindicated for such children. A quart of fruit juices in place of milk, and a low residue, high vitamin content diet, combined with a regimen of rest, have proved successful.

LUCAS, W. P., and PRYOR, H. B. Factors Involved in Combating the "Hunger Strike" in Children. Am. J. Dis. Child., 41, 2: 249 (Feb.), 1931.

Delinquent Venereal Cases—Health officials perplexed by the problem of delinquency in venereal disease clinic attendance will find much to console them in this British discussion of "defaulters" in the Glasgow clinic.

MACGREGOR, A. S. M. The Problem of the Defaulter in V. D. Treatment Schemes. Med. Off., 45, 5: 49 (Jan. 31), 1931.

Student Health Problems—Two questions are answered: should definite health instruction be included in the curriculum? and what are the desirable relationships between health and physical education?

OBERTEUFFER, D. Two Problems in Health Education. J. Health & Phys. Ed., 2, 2: 3 (Feb.), 1931.

Nutrition and Growth—A group of underweight children on a special dietary of milk, whole-grain cereals, vegetables and fruit (meat and eggs excluded, making a preponderance of base-forming elements) made better gains, as judged by several anthropometric measures, than did a control group on a representative American dietary.

ROSENBERG, L. C. Malnutrition in Children. Am. J. Dis. Child., 41, 2: 303 (Feb.), 1931.

Preventing Colds at Cornell—Students unusually susceptible to colds were divided into a cold prevention class and a control group. A reduction of about 50 per cent in colds was accomplished. If you would like to know how and what the possibilities in cold prevention are, read the article.

SMILEY, D. F., and MAUGHAN, G. F. Cold Prevention Work at Cornell University. Sci. Monthly, Mar., 1931, p. 235.

Industrial Nursing—A series of brief articles on industrial nursing problems make up the bulk of this issue of the Public Health Nurse. They are too numerous and brief to be mentioned separately in this bibliography, but all are well worth study.

TUCKER, K., *et al.* Industrial Nursing. Pub. Health Nurse, 23, 2: 55 (Feb.), 1931.

NEWS FROM THE FIELD

Edwin J. Banzhaf

DR. EDWIN J. BANZHAF died suddenly of heart disease on March 17.

After graduation from Lawrence College he continued his studies at Columbia University where he received a degree of Doctor of Philosophy. Shortly after leaving Columbia University he became a member of the staff of the bacteriological laboratories of the Department of Health of the City of New York. For a period of 27 years he has been in charge of the chemical side of the production of biological products. His first important work was on methods of improving the refining of diphtheria antitoxin. This was published in 1907.

The endeavor to devise methods better to refine and concentrate the various antiserums became his life work. These included diphtheria and tetanus antitoxin, antimeningococcic, antipneumococcic and antipoliomyelitis serums.

During the past three years he spent a great deal of time trying to eliminate the chill producing substances from antipneumococcic serum. His efforts met with marked success. His duties were gradually widened until he assumed control not only of the refining and concentrating of the different serums but also of some of the preventive vaccines, such as diphtheria toxin-antitoxin and toxoid. In time he also undertook the supervision of the preparation of the biological products for the final distribution to the physicians. He became one of the Assistant Directors of the Laboratories, January 1, 1910.

As his experience increased, he became widely known as probably the one in America who knew most about the practical refining of antibodies. A number of the biological plants in this part of the country so appreciated his knowledge that they appointed him a consultant.

Dr. Banzhaf was a scientist of the first order. He was modest and retiring in his disposition but made many warm and lasting friendships. His death is a very great loss to the laboratory in which he worked and to the people of the country. Not only those who were his colleagues but all workers in his field will miss him greatly.

New Mother's Day

WOMEN'S clubs throughout the country will join in an appeal on Mother's Day, May 10, to obtain adequate maternity care for mothers in the United States. Details may be had from the Maternity Center Association, 576 Madison Avenue, New York, N. Y.

Swiss Exhibition for Hygiene and Sport

THE first Swiss exhibition for Hygiene and Sport, the "Hyspa," will be held at Berne from July 24 to September 20. The Exposition buildings are now being erected on the spacious Viererfeld for the following groups: Climatology and Balneology; Home and Residence; Diet, Food and Beverages—A Model Dairy; Clothing and Styles; Care of the Human Body and Sport; Protection of Workers, Social Welfare and Insurance; Infectious Diseases; Hospitals and Nursing; Medical Research and Medicines; Hygiene of Youth and Welfare of Mothers; Hygiene in Traffic; Mankind, including

Anatomy and Physiology—the history of medicine and natural sciences, etc.; Statistics; Army Sanitary System; Industry and Trade.

NATIONAL TUBERCULOSIS ASSOCIATION ANNUAL MEETING

THE annual meeting of the National Tuberculosis Association will be held at Syracuse, N. Y., May 11 to 14.

In conjunction with this meeting the Executive Committee has proposed a "pilgrimage" to Saranac Lake, which is only about 200 miles distant, and would like to hear as soon as possible from members and friends who would be interested in this pilgrimage.

NEW ENGLAND HEALTH INSTITUTE

THE New England Health Institute will be held in the Eastland Hotel, Portland, Me., April 20 to 23, 1931. The program is arranged in 10 sections. The sections and the chairmen of each are as follows:

	No. of Lectures
I Public Health Administration—Dr. Charles F. Dalton, Secretary of Board of Health, Burlington, Vt.	5
II Preventable Diseases and Cancer—Dr. Howard A. Streeter, Health Officer, Manchester, N. H.	7
III Sanitation and Engineering—Prof. Ira V. Hiscock, Yale School of Medicine, New Haven, Conn.	6
IV Tuberculosis—Dr. Alton S. Pope, Director, Division of Tuberculosis, State House, Boston, Mass.	6
V Venereal Diseases—Dr. Charles A. Weaver, Director, Division of Venereal Disease Control, Concord, N. H.	5
VI Child Hygiene—Charles F. Wilinsky, M.D., Deputy Health Commissioner in charge Child Hygiene and Health Units, Boston Health Department, Boston, Mass.	6
VII Mental Hygiene—Dr. Carl D. Bond, Pennsylvania Hospital, Institution for Mental Hygiene, Philadelphia, Pa.	5
VIII Health Education—Prof. C. E. Turner, Massachusetts Institute of Technology, Cambridge, Mass.	3 Sessions
IX Vital Statistics—Dr. T. F. Murphy, Chief Statistician for Vital Statistics, Bureau of the Census, Washington, D. C.	5
X Public Health Nursing—Harriet Leck, R.N., Visiting Nurse Association, Hartford, Conn.	5

Dr. C. F. Kendall, Commissioner of Health, is director of the New England Health Institute and Dr. W. L. Holt of the Maine State Department of Health is chairman of the program committee.

Preliminary announcements will be sent out early in March to all physicians, dentists, nurses and health workers. The program is nearly complete and will be mailed some weeks later to all members of the A. P. H. A. in New England and others interested.

Among the prominent speakers will be Dr. T. J. Parran, Dr. William J. French, Dr. C.-E. A. Winslow, Dr. S. D. Kramer, Dr. F. L. Hoffman, Frank Kiernan, Dr. Matthias Nicoll, Prof. C. E. Turner, Dr. R. B. Kerr, Dr. T. F. Murphy, and Dr. H. L. Lombard.

TEXAS SHORT SCHOOL

DATES for the Ninth Texas Sanitarians Short School have been designated for November 9–14, inclusive, at Houston, Tex. Those in charge

are: Dr. H. K. Read, President of the Texas Public Health Association; Dr. Allen C. Hutcheson, Director of the School; C. F. Browning, General Chairman; and E. G. Eggert, Secretary.

COLLEGE HYGIENE

THE National Conference on College Hygiene to be held at Syracuse University, Syracuse, N. Y., May 5 to 9, under the joint auspices of the Presidents' Committee of Fifty on College Hygiene, The American Student Health Association, and the National Health Council, aims to come to an agreement on desirable minimum standards for the teaching and practice of college hygiene. Dr. T. A. Storey of Stanford University is Chairman of the Conference and Dr. H. S. Diehl, Dr. Walter Brown, Dr. Joseph Raycroft and Dr. D. H. Smiley head the four sections on Health Service, Health Teaching, Physical Welfare Activities, and Miscellaneous Problems. Reduced rates on the certificate plan have been granted by the railroads.

MICHIGAN PUBLIC HEALTH ASSOCIATION

THE Tenth Annual Conference of the Michigan Public Health Association and the Michigan Department of Health was held in Lansing, January 7–9.

The officers elected for 1931 were as follows: Dr. C. C. Young, President; Dr. Merrill E. Champion, Vice President; Dr. W. J. V. Deacon, Secretary-Treasurer; Dr. C. C. Slemons, Representative on the Governing Council, A. P. H. A.

RESEARCH FELLOWSHIP OFFERED BY NATIONAL TUBERCULOSIS ASSOCIATION

THE National Tuberculosis Association announces a limited number of fellowships in social research as related to tuberculosis, open to graduate students who have had special training in statistics, social science, or public health. Preference will be given to candidates who are interested in pursuing research in public health after the completion of this fellowship. Interested candidates should write to Jessamine S. Whitney, Statistician, National Tuberculosis Association, 450 Seventh Avenue, New York, N. Y., for further information.

NORTHERN CALIFORNIA PUBLIC HEALTH ASSOCIATION

THE annual meeting of the Northern California Public Health Association was held in the Women's City Club in San Francisco on February 7 with an attendance of over 100.

The following officers were elected: President, Guy S. Milberry; First Vice-President, Thomas A. Storey; Second Vice-President, Dr. W. H. Kellogg; Treasurer, Mary E. Davis; Secretary, Walter H. Brown.

NEW YORK SPECIAL HEALTH COMMISSION

NEW York State, through a Special Health Commission appointed by Governor Roosevelt, has recently issued a report the recommendations of which have been incorporated in a Bill now before the state legislature, leading to a new forward-looking program of public health administration.

Dr. Livingston Farrand, President of Cornell University, as Chairman of the Commission has issued a statement indicating that the major recommendation of the Commission is that a county board of health be organized in each county in the state in place of the present system of small township and village health units.

Other important recommendations of the Commission include the provision for additional state tuberculosis sanatoriums, an enlarged cancer program, more adequate facilities for the discovery and care of crippled children, increased authority over the sanitary control of public water supplies and stream

pollution, and provision in the program of county boards of health for the diagnosis and treatment of the venereal diseases, more extensive health measures for mothers and children and better trained public health personnel.

PERSONALS

DR. GEORGE W. GALE, who is 94 years old, is planning to retire as a member of the Saugus (Mass.) Board of Health when his term expires after nearly 35 years' service.

COL. MATTHEW A. DELANEY, Army Medical Corps, Chief Medical Adviser to the Governor General of the Philippines, will on May 1 become Chief Surgeon, 5th Corps Area, Columbus, O.

VERANUS A. MOORE, M.D., D.V.M., D.Sc., Dean Emeritus of the New York State Veterinary College of Cornell University, died on February 11 as a result of cardiac weakness following a major operation. Dr. Moore has been a member of the American Public Health Association since 1896, and a Fellow since 1922.

DR. HAROLD RYPINS of New York was elected president of the Federation of State Medical Boards of the United States.

DR. WALTER W. LEE, formerly with the State Department of Health of Connecticut, was recently appointed District Health Officer in the Berkshire District of Massachusetts.

JOSEPH P. DAY was reëlected president of the Judson Health Center, 237 Thompson Street, New York, N. Y.

LOUIS CARLETON BULKELEY of Shreveport, La., passed away on December 24, 1930. He was a Fellow of the American Public Health Association.

DR. R. E. HICKEY on February 1 became Director of the Bureau of Communicable Diseases, of the Department of Health, Milwaukee, Wis., filling the position vacated by Dr. M. R. French, now of the New York State Health Department.

J. ROSSLYN EARP, Dr.P.H., formerly Director, Department of Health, Antioch College, Yellow Springs, O., was recently appointed Director, Bureau of Public Health for the State of New Mexico. He succeeds George S. Luckett, M.D., who resigned several months ago.

WADE H. FROST, M.D., has been appointed Dean of the School of Hygiene and Public Health at Johns Hopkins University, succeeding W. H. Howell, Ph.D., M.D., who has been Director.

CONFERENCES

April 8–11, American Physiological Society, Montreal, Can.

April 8–11, American Society for Experimental Pathology, Montreal, Can.

April 8–11, American Society for Pharmacology and Experimental Therapeutics, Montreal, Can.

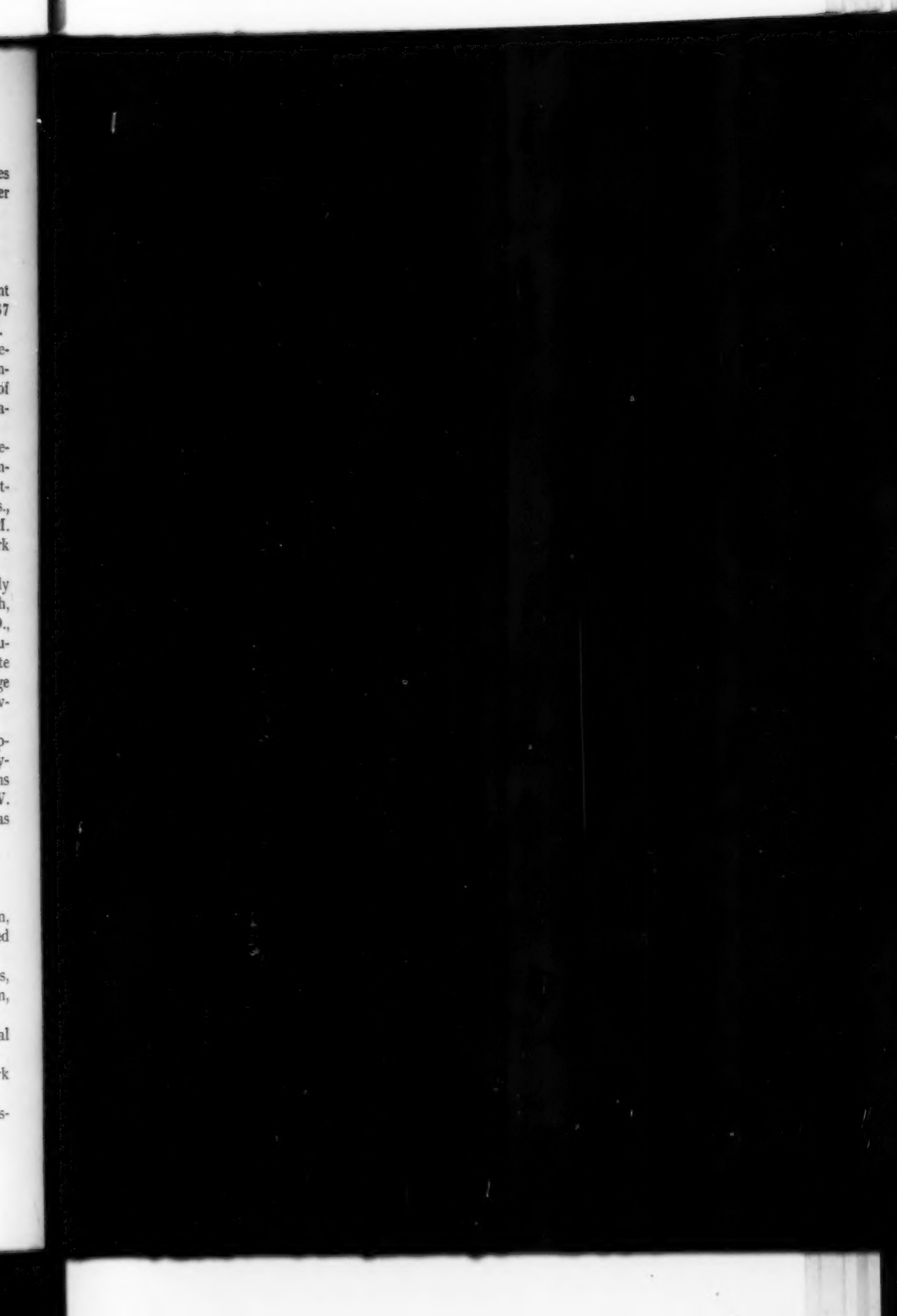
April 8–11, American Society of Biological Chemistry, Montreal, Can.

April 8–11, Federation of American Societies for Experimental Biology, Montreal, Can.

April 12–15, Tenth Annual Convention, International Society for Crippled Children, Cleveland, O.

April 13–16, American Red Cross, National Convention, Washington, D. C.

April 14–16, Tennessee State Medical Association, Knoxville, Tenn.

April 14–20, World Conference on Work for the Blind, New York, N. Y.

April 15–18, American Orthopedic Association, Memphis, Tenn.